RAILROAD GAZETTE

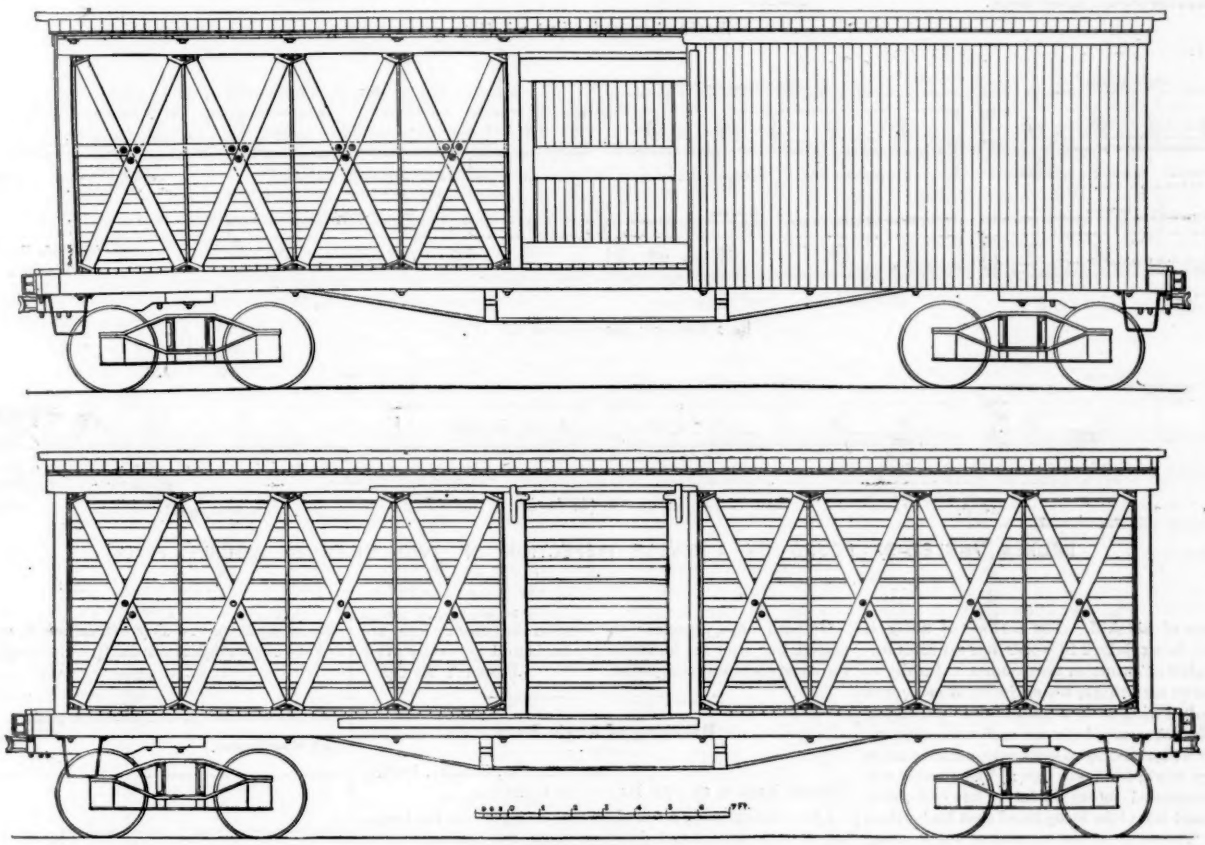
FRIDAY, MARCH 6.

## Howe Truss Car Framing.

We illustrate in outline a new method of constructing the side framing of box and stock cars as now practiced by the Pennsylvania Railroad Company, which has nearly 1,000 cars running framed in this manner. Besides making a stronger car, we understand the objects of this construction to be the stiffening of the house or body endwise, so as to be better able to resist sudden shocks without injurious racking, and the strengthening of the side walls to prevent bulging outward under the pressure of a bulk load. These results are reached by an adaptation to car framing of the Howe truss bridge framing, which is well adapted to performing these two important duties, at the same time that it adds to the strength of the structure considered as a bridge. The necessary omission at the doorway of the members required for a complete truss is compensated for by the introduction of a strip between the top of the door posts and secured to the under side of the plate, while the flooring performs the same service, as usual, at the bottom of these posts. The omission is the less important because the central braces of a Howe truss have very little strain on them (except counter strains from unequal loading), while, on the other hand, the horizontal chord strains are there the largest. Therefore, provided the load be equally distributed between the two ends of the car, and the "lower chord," or outside sill, has sufficient surplus strength to act as a beam across the space occupied by the door, and provided also that the "upper chord," or plate, has sufficient stiffness not to buckle or spring under the compressive strain across the same opening, when assisted by the reinforcing strip referred to, all of which conditions may be expected to be closely approached in practice, there is no theoretical loss of strength in the truss whatever from the omission, from what would exist if the bracing were carried completely across the door-space.

The braces and counter braces are all made of the same length and have a square bearing on the angle blocks. These braces have been made 5 in. × 2 in. in the cars already built, and they are not notched together. The bodies are 34 ft. long, and with proper trucks are considered to be able to carry 60,000 lbs. of lading. They have a camber of 1-in. framed in by drilling the holes in the sills and plates to template and spacing them as required; the vertical tie-rods are ⅞ in. diameter, riveted over under the nuts. By reason of this construction the car weighs 1,000 lbs. more than it would weigh if otherwise the same but with the side framing made of the usual half-truss with angle-block castings.

When the heavy trains of heavily laden cars now generally handled are considered, and it is remembered that a large part of the deterioration of the car body arises from the endwise racking under this severe service, it seems reasonable that the departure from the ordinary practice made in this method of framing may give great advantages at the cost of adding but little more material, since each new part introduced acts in a very direct manner to serve a threefold purpose, viz., to strengthen the car vertically, to stiffen the body endwise, so as to insure less rapid deterioration, and to strengthen the sides laterally, so as to be better able to resist internal pressure.



HOWE-TRUSS CAR FRAMING.

# Contributions.

## Railroad Maps and Surveys.

DULUTH, Minn., Feb. 12, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It looks to me from the tenor of Mr. Brendlinger's article in the *Gazette* for Feb. 6 as if this contour map business was developing almost too much bad temper. I am not an engineer of wide experience, and would not set my opinion up as worth much in a case of this kind; but it looks to me as though a little charity might well have place in this matter. As to "Olif's" expressed opinions, I have frequently heard similar opinions from headquarters of certain great railways. And individually I would sooner take a line which Mr. Sheldon, of the Chicago, Milwaukee & St. Paul, had located with his "practiced eye" than any office location I can conceive of. While on this subject one may be permitted to revert to a piece of location on the Northern Pacific road, which is so execrable that it has caused a most acid quarrel among officers of the road, a part of which has got into print. I mention this as it is public property, and will give an opinion which I heard expressed by a chief engineer of one of the systems radiating from St. Paul. "It was made," he said, "by one of the best-educated and most competent engineers in the country; but no man can make a location in such a country from his office. It must be made by a man on the ground."

Is it not largely the man who does the work? Maps have their use, but great systems of road such as we have seen grow in a few years in the Northwest cannot wait for them. When a man is doing his work conscientiously, he will use *all* the aids possible in difficult locations. But here arises the old problem of grades or curves, and the other of how greatly we may increase the cost of our road to avoid grades. And behind all these stand the board of directors, or, what is worse, the construction company, tying the engineer's hands. He must strike this town. He must cross this stream at such a point. He must run through this body of land. He must get here in order to earn the grant or the bonus, and all the while must not spend above a certain amount of money. And in after time the faults of location are all charged to the engineer. And we can all recall instances where roads have been so expensively built as to be unable to earn their fixed charges, and others where a large traffic has grown on which the heavy grades and curves of a cheap location grind hard. It is easier to see a mistake that has been made than to avoid making one. Let us be charitable.

ASSISTANT ENGINEER.

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FORT KEOGH, M. T., Dec. 27, 1884.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I would like to call attention to an important point in regard to maps of preliminary and location lines, which has not been mentioned in the correspondence recently published on that subject.

Mr. Low "invariably makes his meridian agree with one or the other of the edges of the sheets of paper."

I think a better rule is, in plotting any kind of a line, to take the following as a guide: Always have the north end of your meridian pointing to the top of the sheet of paper, as it lies before you on the table, and, if the line runs from west to east, you must plot from left to right, and be sure that your leveler plots his profile from left to right. Should your line run from south to north, you must plot from left to right, as in the previous case. There is nothing so exasperating as to have a map and profile plotted in opposite directions, but I have seen that blunder made again and again.

In this Western country, Plate "B" profile paper (30 ft. per in. vertical) is in general use for profiles, and maps are plotted to the same scale, so that by placing them on a table, one beneath the other, a comprehensive inspection can be made of the line.

That the portfolio or sheet map is superior to a rolled map is beyond dispute.

Too many surveys are now made, and lines of railroad built without making any map to be filed away in the office of the company showing the right of way with all irregular offsets to cover borrow pits or waste banks.

During the past year I was appointed to the by no means pleasant task of furnishing a profile of a road which had been fearfully and wonderfully built. The line was run from west to east, and the profile plotted from left to right, showing an equality of 300 stations, about four miles from the end of the road (terminus), and a variation in the levels, or straight upward jump of 1.96 ft. at the west end of a rock bluff. There was also a revised line changing the initial point of the survey, beginning with 0 = 1,316 of the original line, and the revised line ran from east to west, and the profile was plotted from left to right. In addition to this, there were changes made in the alignment, during construction, and no record kept of the changes.

For an office and right-of-way map, a scale of 200 ft. to 1 in. seems to be preferable, and for a roll map a scale of 800 ft. to 1 in. is much used. There should always be two maps, one on each of the above scales and no survey of any extent is complete without them.

In conclusion, I would say that Mr. Brendlinger has not seen some roads in the great Northwest, or he would have continued his article and given some time to the subject of his alignment and grades.

E. M. SNYDER.

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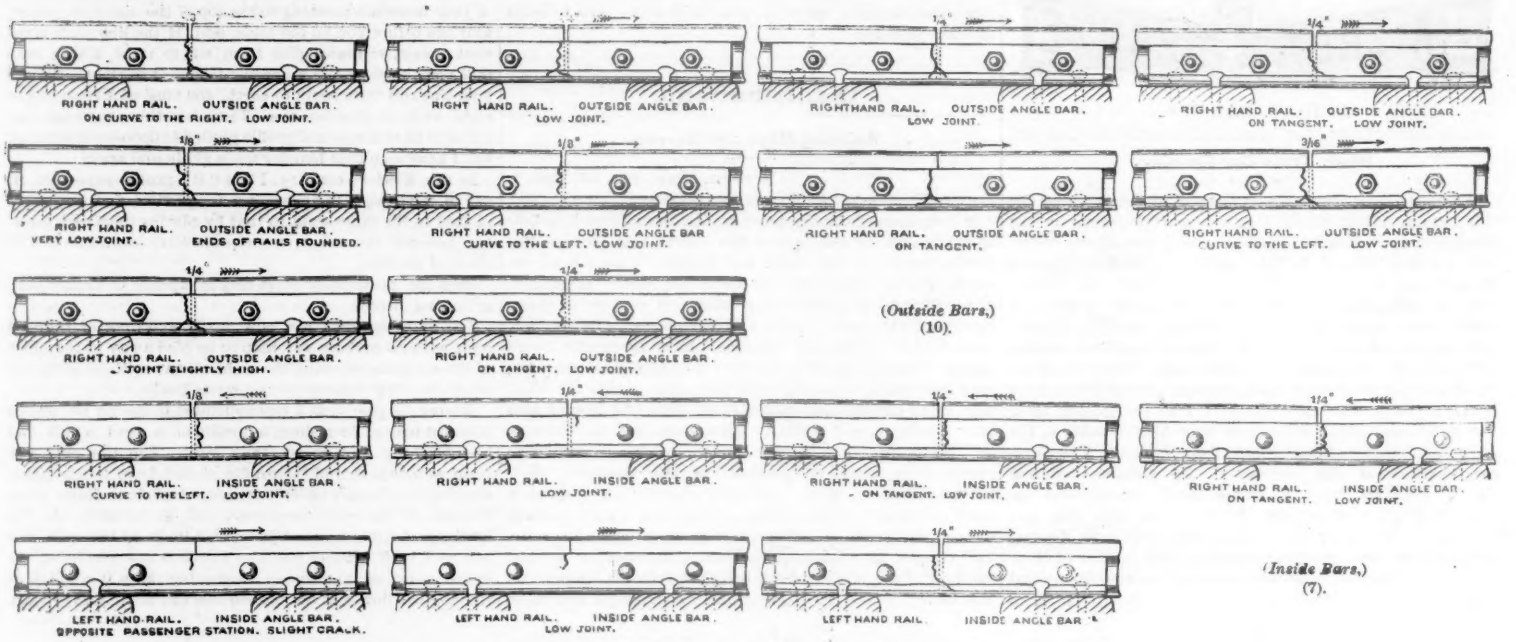
TO THE EDITOR OF THE RAILROAD GAZETTE:

The communication of "Director" in your issue of Nov. 7, as to the meagreness of a map of a preliminary line submitted to the officers of a contemplated road, seems to have formed the basis for a somewhat extended correspondence. The question has now reached some importance from my point of view, as evidenced by the contribution of "Olif" in your issue of Dec. 19th. The work of location is one to which the writer has devoted a considerable part of a lifetime, and feeling, as most of his class do, that it is a neglected branch of engineering of the greatest financial importance, it cannot be otherwise than of interest to discuss it.

What is the manner of proceeding on the part of a competent locating engineer when called upon to establish a line of railroad?

He is fully aware that the preliminary information as to the country to be traversed by the contemplated line can only be obtained by tramping over it, by the doing of which certain things are impressed upon his mind in the shape of salient and controlling points to be avoided or reached. The facility and certainty with which he is able to do this con-


RIGHT HAND RAIL. OUTSIDE ANGLE BAR. ON CURVE TO THE RIGHT. LOW JOINT.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. LOW JOINT.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. LOW JOINT.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. ON TANGENT. LOW JOINT.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. VERY LOW JOINT. ENDS OF RAILS ROUNDED.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. CURVE TO THE LEFT. LOW JOINT.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. ON TANGENT.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. CURVE TO THE LEFT. LOW JOINT.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. JOINT SLIGHTLY HIGH.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. ON TANGENT. LOW JOINT.
(Outside Bars,) (10).
RIGHT HAND RAIL. INSIDE ANGLE BAR. CURVE TO THE LEFT. LOW JOINT.
RIGHT HAND RAIL. INSIDE ANGLE BAR. LOW JOINT.
RIGHT HAND RAIL. INSIDE ANGLE BAR. ON TANGENT. LOW JOINT.
RIGHT HAND RAIL. INSIDE ANGLE BAR. ON TANGENT. LOW JOINT.
LEFT HAND RAIL. INSIDE ANGLE BAR. OPPOSITE PASSENGER STATION. SLIGHT CRACK.
LEFT HAND RAIL. INSIDE ANGLE BAR. LOW JOINT.
LEFT HAND RAIL. INSIDE ANGLE BAR.
(Inside Bars,) (7).
Bars broken under first rail (17).
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. CURVE TO THE LEFT. HIGH JOINT.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. LOW JOINT.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. ON TANGENT. LOW JOINT.
LEFT HAND RAIL. INSIDE ANGLE BAR.
LEFT HAND RAIL. OUTSIDE ANGLE BAR.
(Outside Bars 6). (Inside Bars 1).
Bars broken under second rail (7).
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. ON TANGENT. EDGE OF OPEN CULVERT.
RIGHT HAND RAIL. INSIDE ANGLE BAR. ON TANGENT. EDGE OF OPEN CULVERT.
RIGHT HAND RAIL. INSIDE ANGLE BAR. JOINT SLIGHTLY HIGH.
RIGHT HAND RAIL. OUTSIDE ANGLE BAR. VERY CAD BAR. "APPARENTLY ORIGINALLY SO."
Bars broken in centre (4; inside 2, outside 2).
1 Foot.
Scale.
BROKEN ANGLE-BARS FOUND ON A SINGLE INSPECTION OF TWO MILES OF DOUBLE TRACK.

stitutes the measure of his skill. The manner of doing it successfully cannot be explained in words nor set rules formulated. It is a kind of intuition that comes naturally to a few, but is denied to (as I think) the majority of men, even to those who are called upon to do a considerable amount of location. Now, the difference, between such a locating engineer and another who relies upon elaborate contour maps for his preliminary work, is simply this: The former will have his location completed before the latter has completed his contour maps, and it is plain to my mind that his location will be the best. The value of the services of the locating engineer depends very much upon the amount of preliminary instrumental work he is able to dispense with.

Contours prepared in the office and lines projected therefrom may prove misleading, and if carried over any considerable length of country are useless. Manipulation is never perfect. Some little discrepancy in levels, a slight error in angles, some defect in chaining, or in the office work, will in most cases render the map useless, and the skillful man will in the end, for finally completing his work, fall back upon his other and more reliable resources.

As to the proper scale for maps, I am inclined to think that it should be governed largely by circumstances, as illustrated by the Union Pacific system. The ground occupied by these lines is of every possible variety, from the smooth Platte Valley, with its light descent (a country with a face but no features, comparatively uninhabited now, and entirely so when the line was established over it), to the other extreme on its Rocky Mountain branches, with gradients of 4 per cent. excessive curvature, gorges, cliffs and slopes of such inclination as scarcely to afford foot-hold. For the division first-mentioned, over 500 miles long, a scale of 1 mile per inch was found ample, and the maps were made in accordance therewith.

On the other hand, in the Rocky Mountains my practice has been to use two scales, one of 1,000 ft. to 1 in., for filing with the Interior Department as required by the law of Congress granting to the railways right of way through the public lands. On this scale it is possible to set forth our lines with detailed accuracy, and also all the important land lines. About 35 miles on a sheet is the rule. In addition to this, our land maps are on a scale of 400 ft. per inch on sheets 19×25 in., bound in atlas form, about 80 miles constituting a single volume. Company property is colored, its boundaries defined, character of conveyance, whether easement, quit claim or fee, with proper references to the public records, name of granter, etc., etc.

On both maps, especially the former, the contour lines are placed, but after the locations are made and generally after the construction is completed. JAMES A. EVANS.

## Breaking of Angle-Bars.

PITTSBURGH, Pa., Jan. 21, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE.

I have lately made a few observations regarding the breaking of angle-bars of rail joints on about two miles of double track on one of the railroads leading out of this city.

The track is in generally fair condition, the ballast mostly used being cinder from blast furnaces. The cross-ties are oak, most of them sawed. The rail is 60 lbs. per yard, and all nuts and bolts are supplied with the Verona nut-lock.

The rail has been down about three years. The angle-bars were 24 in. long. I found the breakages to be divided between the inside and outside bars of the inside and outside rails as follows: [We have re-arranged the data in the form of a little diagram, in order to make the facts more readily comprehensible.—EDITOR.]

| | | | |
|---|---|---|---|
| ☞ West-bound. | Outside, 12 | | |
| | Inside, 4 | —(all in conjunction with a broken outside bar.) | |
| | Inside, 4 | (none conjointly.) | |
| | Outside, 1 | | |
| ☞ East-bound. | Outside, 1 | | |
| | Inside, 0 | | |
| | Inside, 2 | —(both in conjunction with a broken outside bar.) | |
| | Outside, 4 | | |

Total broken, 28—18 outside, 10 inside.

It will be observed that on both tracks the greater number of breakages occurred on the right-hand rail of each track, and again that most of the broken ones were the outside angle-bars. Of the 6 broken inside bars on the outside rails, every one was accompanied by a broken outside bar, there being 10 broken outside bars not so accompanied.

In order to understand the points of the angle-bars at which the fracture took place, I will designate the two rails connected by angle-bars as the *first* rail and the *second* rail, it being apparent (counting in the direction of the traffic) that the end of the first rail is the beginning of the second rail.

The distribution of the ruptures as respects their position on the angle-bars was as follows. [We again rearrange the data in the form of a diagram, as before, and have also classified the engravings accordingly.—EDITOR]:

| | First rail. | Middle of joint. | Second rail. | Total, as before. |
|---|---|---|---|---|
| | 9 | 0 | 3 | 12 |
| ☞ West-bound. | 3 | 1 | 0 | 4 |
| | 3 | 0 | 1 | 4 |
| | 0 | 0 | 1 | 1 |
| | 0 | 0 | 1 | 1 |
| ☞ East-bound. | 0 | 0 | 0 | 0 |
| | 1 | 1 | 0 | 2 |
| | 2 | 1 | 1 | 4 |
| Totals..... | 18 | 3 | 7 | 28 |

In regard to the character of the fractures of the broken angle-bars, so far as my examination goes, I noticed that the outlines of the same were very irregular and can be best compared in appearance to the windings and turnings of a very crooked brook, though in miniature.

Only in one case was the angle-bar broken entirely in two. In 15 cases the fracture occurred only in the vertical part of the angle-bar, and in 12 cases the fractures extended over the entire depth of the vertical portion of the same and partly across the lower *angled* part of the bar.

One curious fact that I noticed was, that in some instances the fracture separated, as it were, at the angle formed by the upper and lower part of the angle-bar, forming two distinct, separate cracks, their shape being generally that of an inverted letter V.

Most of the broken angle-bars occurred at joints which were low, although there was an occasional breakage at a high joint and also at joints which were in perfect surface.

It is not my purpose here to give an explanation of the reasons causing these breakages, merely contenting myself to give the facts as I found them. EMILE LOW.

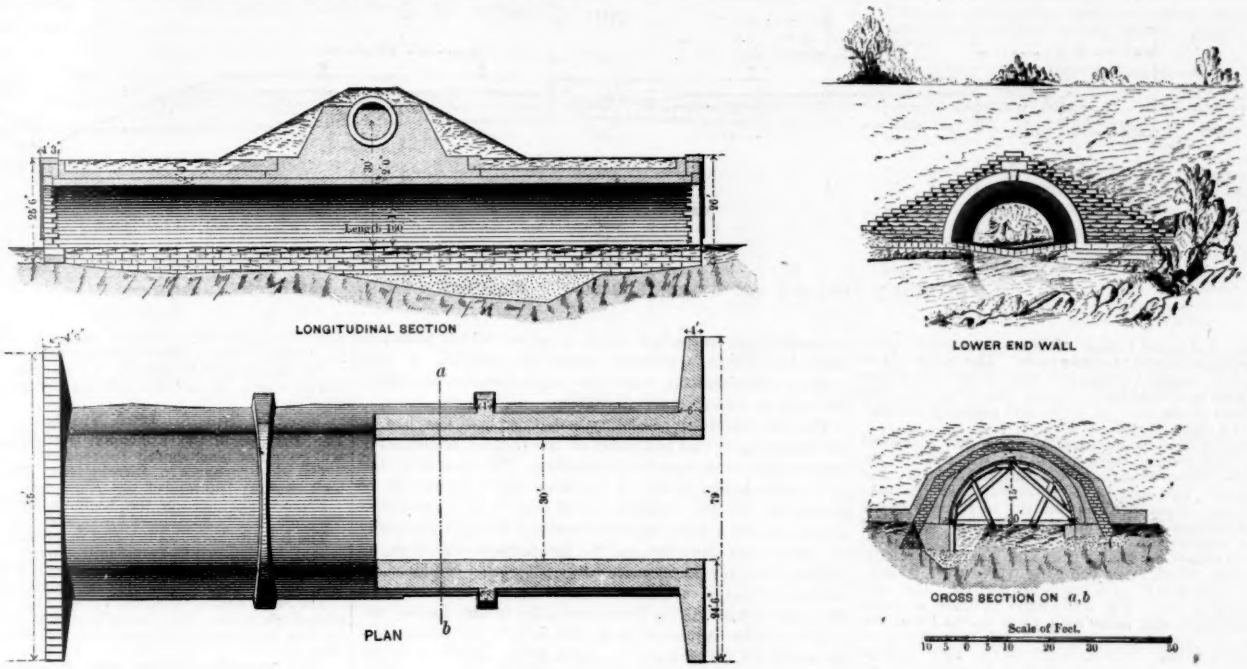
## The Form of Culverts.

*Richmond, Fredericksburg & Potomac Railroad, General Superintendent's Office,*
RICHMOND, Va., Jan. 31, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Permit me a few words touching the culvert question, with which your issue of 23d inst. deals. I write with the object of assisting you to direct greater attention to the subject.

I think it is putting the case too strongly to say that a certain proportion of any number of well-designed culverts *ought*

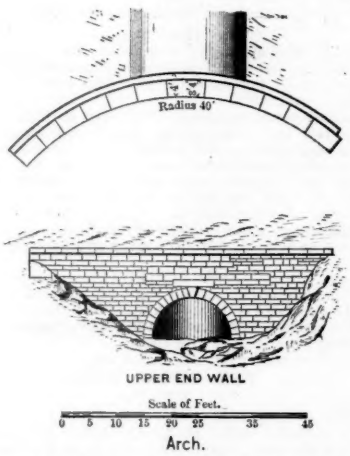



CULVERTS, WASHINGTON AQUEDUCT.

to fail. There is risk that such a dictum may be misconstrued, and held to justify stingy or careless work. The aqueducts, upon which many cities depend for water, must, of necessity, be constructed in such a way as to be quite as storm-proof as the public buildings must be fireproof.

The culverts on the best canals, roads and railroads should likewise be held as entirely secure, and such security can scarcely be the result of unwise designs, but rather the reverse.

As to cross section, is the segment surmounting a rectangle always to be preferred to a semicircle? The first form necessarily requires more masonry, and will not discharge so much




Arch.

water. The last is more apt to catch drift, and, because of the greater cost of arched over straight work, may frequently be less economical. But the conditions vary too much to justify, as it seems to me, any absolute rule about it.

I concur with you as to the propriety of avoiding the *shoulder* at the up-stream face of the arch, and have for years followed such a practice. I am inclined to think the splaying of the wings objectionable in some respects, and to prefer the simple straight channel, bounded by parallel lines throughout. There is a better chance of excluding drift, and the floor can be better managed. I would also suggest that parapets had better be kept as low as possible.

In my limited experience, the greatest trouble has arisen from the rude construction of the smaller drains—what are known as "box" culverts—which are frequently laid without mortar, and covered with rough stone, between which, remain interstices so large that water, forced through them in floods, softens and carries away the superincumbent earth. A cavity thus formed soon leads to mischief, and generally to destruction. If, on the other hand, the masonry be well laid in mortar, and the covering, especially, well sealed with spalls, imbedded in mortar, the culvert will be safe when acting as a pipe, discharging under head. Brick culverts are preferred by many engineers, for this reason, and it is very desirable that the water which enters shall escape nowhere but at the outlet provided for it.

The want of proper safeguards at the ends is a common fault. Unless in the case of rock bed, a hole will always be scoured out at the mouth; and into this hole, unless protected, the masonry will gradually descend. An apron wall extending below any possible cavity is effectual, but sheet piling is too often trusted. A crib, fashioned like a section of sub-dam, extending well beyond the sides of the opening, is, where water is always present, an excellent device.

The upper end of the box culvert should, I think, be as indicated by the sketch, the buttresses *aa* catching the drift well outside of the aperture at the face. I have experienced the advantage of such construction, and it is well to avoid a long rectangular opening, less than 2½ wide by 3½ in height.

Culverts of brick or stone, well built, can be relied on when flushed, and, when reasonably good judgment has been exercised in determining their size, will rarely, if ever, fail to perform their proper function.

I enclose herewith a few drawings which illustrate types of culverts built some 27 years ago, which have withstood the storms of that period safely, and which will show with what care such details are sometimes studied by engineers. There are some features peculiar enough to attract attention, and possibly to invite criticism, but I think there is also something to be learned from them. The name of the designer, Gen. M. C. Meigs, is well known. E. T. D. MYERS.

**[A semi-circular arch culvert, springing not from a high abutment, but directly from the foundation, such as the Washington Aqueduct culverts which Major Myers sends drawings of, possesses much the same advantages as the segmental arch springing from abutments. In fact, the only difference between them is that a rectangle of plain block masonry is, in the segmental culvert, for economy's sake, substituted for the lower quarter or sixth of the arch, on each side, where it is nearly vertical. Such a culvert, we attempted to show, has both much greater stability and much greater discharging capacity than any semi-circular *springing from abutments* containing no greater amount of masonry. Major Myers apparently contests this, but we think does so only with reference to the form shown in his drawings enclosed, the excellence of which may be admitted, although the large amount of arch stone makes them too expensive for railroad use, unless when (as in this case) they are brick.—EDITOR RAILROAD GAZETTE.]**

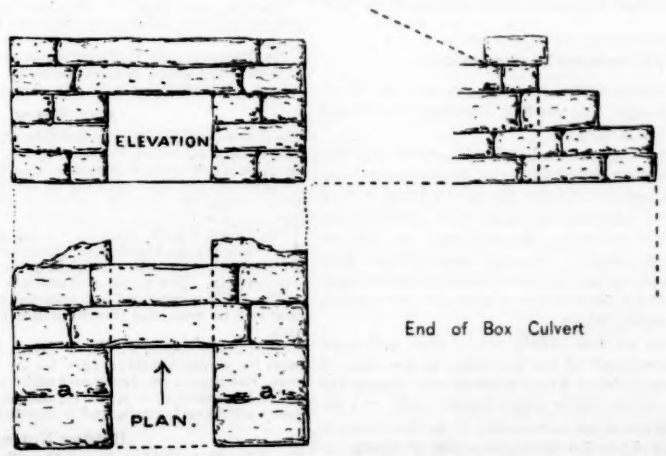
## Where Do Rails Break?

NEW YORK, Feb. 27, 1885.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your classification of January accidents on the various railroads, it appears that there were 23 due to broken rails.

Can you tell me whether the break is found to take place at the ends of the rails, where the bolt holes have weakened the structure, or is there any regularity to the point of breakage?




End of Box Culvert

If experience shows that the break occurs at the bolt holes, how much increase of strength would come from punching or drilling holes for ⅝ in. steel bolts rather than ¾ in. iron bolts? F. H. H.

**[In most cases of broken rail accidents the point at which the rail breaks is not specified. In the majority of those cases where we have succeeded in getting more definite information the point of breakage is given as "near the end of the rail," but they are too few to base any conclusion on. Perhaps some of our readers can give our correspondent the desired information.—EDITOR RAILROAD GAZETTE.]**

## Low Suburban Passenger Rates.

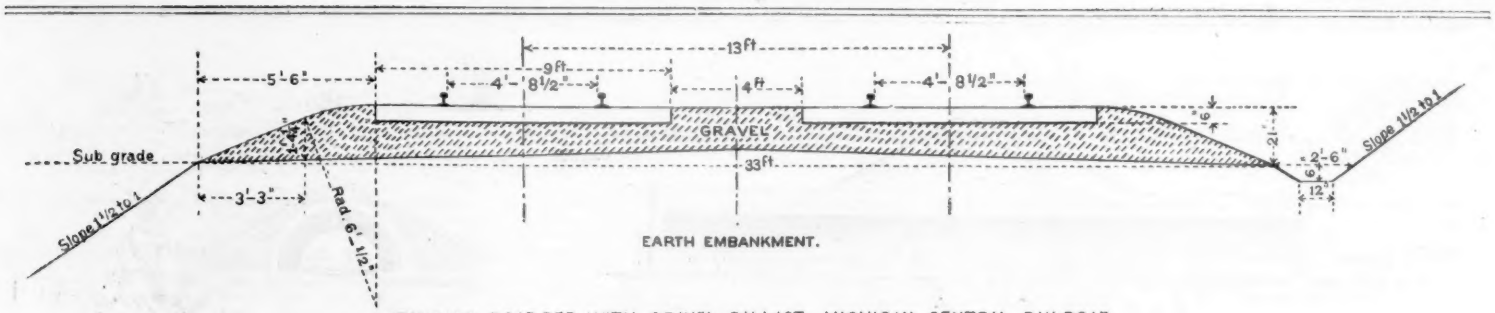
In denying the application of the Selectmen of Natick for lower rates over the Boston & Albany road, the Massachusetts Railroad Commissioners make the following statement of the general principles governing their action in this and other similar cases:

1. The reasons of railroad managers for fixing low suburban fares (apart from the idea of competition with other roads for residents and with horse railways for business) are the great volume of passenger traffic afforded by those suburban places where the head of almost every family spends his days in Boston, and the desire to increase the number of that class.

In Natick, owing to its distance from Boston and the business character of the place itself, the number is not such as to call for action. Only 85 men use season tickets in any form. In Newton these passengers are counted by hundreds.

2. The results of extending the low rates indefinitely can be seen by a simple computation. The people of Natick claim a right to ride for 1 cent per mile, or considerably less, because their suburban neighbors do so. If this claim is granted, it must next be yielded to the people of South Framingham; and this was not desired by the petitioners. But the same rate would be demanded first for Ashland, then for Westboro, and next for Worcester; and there is no principle of law and no sound reason which would prevent its extension over the whole road. But even the Boston & Albany Co. cannot afford to transport its passengers at the rate of a cent a mile. And if this road were compelled to do this on a claim of right, all the other roads that have adopted the system of low suburban rates must do the same. And the result would be general railroad bankruptcy.

It is evident, therefore, that if a continuance of this system were found to compel an indefinite extension of proportionally low fares, the result would be not that extension, but the abolition of the system itself. And this has led the Board to consider the question carefully. For it would be no light matter to break up a practice which in some form and to some extent exists on all our railroads, and also on the rail roads of other states and other countries. It is a system to which householders have trusted in selecting their homes, and by which communities have been built up and have flourished. The question before us is not whether it has been carried further than was wise, nor is the correctness of its details subject to our criticism. The relations of the petitioning




STANDARD ROAD-BED WITH GRAVEL BALLAST—MICHIGAN CENTRAL RAILROAD.

town to Boston and to the village of Newton exclude questions that have been raised in other cases. The single claim is that a railroad company giving low rates to stations within 12 miles is bound to extend them beyond that distance. The petitioners stand on the rule of three, and demand proportional fares as a right.

One answer to this in Massachusetts is the policy adopted by the state, encouraging residence in the suburbs for the families of those whose days must be spent in the city. The law-giving power has deemed it important that the men whose avocations compel them to visit the metropolis every day should, with their families, enjoy the fresh air and other advantages of country life. And to this end the state has departed from its almost invariable rule, and has fixed a rate for certain trains, which every company whose road terminates in Boston must run if such trains are desired. The rate is as low as a cent a mile. The hours fixed indicate a desire to accommodate men who labor with their hands; and the popular name of "workingmen's trains" has been given to these statutory facilities. But no word in the law confines their benefits to any one calling, or shows a disposition to engage in class legislation.

While this statute is in force, no railroad company here can be censured for moving in advance of legislation, and extending the benefits of the act in a manner strictly analogous to this benevolent law.

And when the puzzling questions are asked: "Where shall the limit be fixed?" "Shall a fraction of a mile in distance deprive a place of the favorable rate?" "How can you stop if you once begin?" the answer is easy. So long as the railroad managers abide by the limit fixed by law, and do not give a suburban rate beyond 12 miles. The Boston & Albany does not extend its system beyond this point. Whether it was right in extending the low rates beyond the stations for whose benefit they were especially established, and whose volume of passenger traffic justified this establishment on general railroad principles, we are not called upon to decide. The claim made in behalf of Natick is not founded on any such small point. It does not depend upon any rivalry with Riverside or Rice's Crossing.

The rates at these unimportant points may be too low, and may be inconsistent with the general system. They are said to arise from an attempt to combine two opposite schemes—one an old plan by which the rate per mile was reduced as distance increased, the other the suburban system of low fares for short distances. The result may be somewhat inconsistent and fantastic. But the action of this Board is not invoked for such cause. We are not called upon to correct an inequality in fares unless it injures some one. These rates harm no one.

Upon the whole case, the Board cannot say that the fares complained of are unreasonable, nor can we recommend the reduction for which the petitioners ask.

### Standard Road-bed, Michigan Central Railroad.

The section of road-bed shown in the engraving herewith is something of an innovation, although it seems to be finding increasing favor, especially on single-track roads with narrow and ragged earth road-beds. The peculiarity of it is, of course, carrying up the ballast flush with the top surface of the ties at each end and between them. The advantage gained is greater lateral stability for the ties and a neater appearing road-bed, although opinion differs on this point somewhat. The disadvantage is, besides the extra quantity of ballast required, that the drainage is not quite so good at any time and in freezing-and-thawing weather, with a frozen road-bed, there is a possibility at least that water will be held between the rails instead of escaping under them, and will freeze flush with the rail's surface, causing derailment. The danger of this decreases very rapidly, however, with volume of traffic and care of trackmen, and on such a road as the Michigan Central may fairly be considered very small, but it has been at times a source of trouble and accident. Opinion will hardly be unanimous, therefore, in favor of the section shown, although it certainly has marked advantages when there is sufficient ballast under the ties, as well as at one side of them.

### Cilley's Railroad Ticket-Holder.

This charming ticket-holder, recently patented by Mr. S. E. Cilley, of Tunbridge, Vt., we find illustrated in the last issue of the *Scientific American*.

Mr. Cilley is to be congratulated on having so nice a ticket-holder, but how he got a patent on her we do not understand; perhaps by adducing in evidence the poet's lines, "Ever charming, *ever new*"; perhaps his claim was simply on the improvement in her, as being "Heaven's *last*, *best* gift, (as well as) my *ever new* delight." One can patent almost anything nowadays, and the accomplished literary and graphic artists of the *Scientific American* patent agency can do much by their way of putting things.

But such a claim, we fear, would never pass, and more probably recourse was had to the provision in the rules of practice of the Patent Office, as set forth in the abstract of certain patent attorneys, which states (italics ours): "A device or combination *need not necessarily be in itself new*, to be patentable. An old device or combination, *if applied to a new use*, may, on proof of novelty, be patentable *as applied to that use*." Mr. Cilley may have based the claim on his ticket-holder simply on the novelty of his use of her *as a ticket-holder*, which may conceivably have been held novel enough to pass; but the prior use of essentially similar ticket-holders—except that the ticket was carried in the mouth or in a shopping bag or tucked inside a glove—which would no doubt be adduced in rebuttal, makes the granting of such a claim very doubtful, under the strict construction which has come in with civil service reform.

The only remaining possibility is that recourse was had in the beginning to that last resort of the puzzled patent attorney, a claim on the specific combination. Not even in her use as a ticket-holder is she in any sense novel enough to be patentable, but the combination of her *in a ticket-holder* with a pin and a ticket and the front of a dress, substantially as shown and described and for the purpose described, we should pronounce an unquestionably patentable combination, and in fact one of rather unusual novelty and merit. In this way only can Mr. Cilley have secured his patent, for the central idea of his invention is as old as Eve; or at least (for we would not be offensive) is certainly 20—no, 16 years old

A drawback to the device is that it is rather an expensive way of carrying a ticket, but this is an age of luxury, and for that large section of the public which travels on a free pass any way, railroad men, circus agents, members of the Ha-ouse and so on, the expense will be merely nominal—merely that for clerical labor to add the words "and ticket-holder" to the face of the pass, and even for the general public this way of carrying a ticket is a great deal cheaper, and in more truly good taste, than chartering a special car to carry it in, or any nonsense of that sort.

CILLEY'S RAILROAD TICKET HOLDER.

Mr. Cilley has certainly a fertile and ingenious mind. We may say of him, as was said of an even greater man than he, that "his imperial fancy has laid all nature under tribute"—to furnish him with ticket-holders!

## TECHNICAL.

### Locomotive Building.

The Baldwin Locomotive Works in Philadelphia, are building a passenger engine for the Rochester & Lake Ontario road.

The New York, Lake Erie & Western shops at Susquehanna, Pa., are beginning work on a number of new locomotives.

H. K. Porter & Co. in Pittsburgh recently shipped a small engine of 22½ in. gauge to San Domingo. They have built quite a number of small locomotives for use on plantation roads in the West Indies.

The Concord Railroad Co. has just completed a heavy freight engine in its shops in Concord, N. H., for use on the road.

The Pennsylvania Railroad shops at Altoona last year built 81 new locomotives, besides the large number rebuilt and repaired. In 1883 they built 131 new engines.

### Car Notes.

The Jones Car Works, in Schenectady, N. Y., under charge of Mr. Walter A. Jones, President, have closed a contract with the New York Central Sleeping Car Co. for the building of all new cars and the repairing of all old ones for that company during the current year. A considerable number of cars are now in the shops for repairs.

The Union Pacific Railway Co. has given the Westinghouse Air Brake Co., in Pittsburgh, directions to complete the order for brakes for its entire freight equipment at the rate of 15 sets per day. The number of sets yet to be shipped is about 9,500. When this road is completed all the transcontinental lines will be using the Westinghouse brake on their freight cars.

J. N. Jones' Sons, in West Troy, N. Y., have orders on hand for about 200 street cars, to go to San Francisco, Detroit, Baltimore, St. Louis and other cities.

The Laclede Car Co., in St. Louis, has recently received many additional orders, and is increasing its force.

### Bridge Notes.

The Massillon Bridge Co. at Massillon, O., has completed a new iron bridge over the Big Miami River for the Cincinnati, Indianapolis, St. Louis & Chicago road, to replace an old wooden bridge. The new bridge is 532 ft. in length over all.

The contract for the building of 5 piers for the bridge over the Arkansas River at Van Buren, Ark., for the St. Louis & San Francisco road, has been let to William Sooy Smith & Son. The piers are to rest on caissons. The Union Bridge Co. is contractor for the superstructure of the bridge.

The Berlin Iron Bridge Co. is enlarging its shops in East Berlin, Conn., by the erection of a new shop 60 by 100 ft. in size.

### Iron Notes.

The furnace of the Charlotte Iron Co., at Scottdale, Pa., will go out of blast shortly for repairs.

The Sloss furnaces in Birmingham, Ala., are both running well, making 160 tons of pig iron a day.

Princess Furnace on the Richmond & Allegheny road, in Virginia, has been stopped for repairs.

The Birmingham Rolling Mill in Birmingham, Ala., will, it is said, be changed to a steel mill shortly.

South Pittsburgh Furnace, at South Pittsburgh, Tenn., is running successfully and making nearly a full output.

The Soho Mill, of Moorhead & Co., in Pittsburgh, has resumed operations, the men who struck having agreed to go back to work at the reduced rate of wages offered by the firm.

### Manufacturing and Business Notes.

The Morgan Lubricator Co., of Detroit, Mich., is running its works on full time, and reports that since Jan. 1 the business has increased fully 25 per cent., and increased orders continue to come in.

The H. W. Johns Manufacturing Co., of New York, has opened a branch store at No. 175 Randolph street, Chicago, for the accommodation of its Western trade. A full line of the company's asbestos goods, liquid paints, etc., will be carried in this store, and prices will be uniform with those in New York.

The Detroit Railroad Journal Bearing Co., of Detroit, Mich., is manufacturing the Arctic car bearing, which is a gun-metal shell filled with the Arctic anti-friction metal. The company claims for these bearings that they will not heat, and will not wear or cut the journals, the metal being so soft that any grit or hard substance getting in the box will imbed itself in the metal. The bearings will adjust themselves also to badly worn journals, and the company guarantees that each of them will last for 50,000 miles, and that they can be run at any rate of speed. They are manufactured of suitable patterns for locomotives, tenders, passenger cars and any kind of freight cars. The anti-friction metal is also furnished for any company desiring to make its own bearings.

### The Rail Market.

*Steel Rails.*—The market is more active, but unsettled. Quotations may be put at $27@$28 per ton at mill, with a margin for exceptionally favorable orders. The price also depends on the mill, and makers who have not much work on hand may make concessions to keep their mills at work.

*Rail Fastenings.*—Quotations remain nominally at about 1.90@ 2 cents per pound for spikes in Pittsburgh; 2.25@ 2.65 cents for track-bolts, and 1.60@1.75 for splice-bars. Very few sales are noted, and those chiefly on private terms.

*Old Rails.*—The market for old iron rails is firmer, with more inquiry and small stocks. Quotations are $17@$18 per ton at tidewater, and $18@$19 in Pittsburgh. Old steel rails are quoted at $15.50@$16.50 per ton in Pittsburgh.

### Car Couplers.

The United States car coupler has been adopted as a standard by the Ogdensburg & Lake Champlain Railroad, which has extensive business relations with the Massachusetts lines, and interchanges many cars with them.

## THE SCRAP HEAP.

### Tramps.

About eighteen miles above Centralia, Ill., the engineer began to blow toot! toot! toot! and to slacken his pace, and by and by the train came to a standstill. The male passengers rushed out, as in duty bound, and in time to see a man lying on the rails in front of the engine, and another man bending over him. When the crowd, headed by the conductor, reached the spot, the man on his feet explained:

"I discovered him about ten minutes ago, and as I didn't want to see the train run over him I gave you the signal."

"But why didn't you pull him off the track?" asked the conductor.

"I couldn't be hired to touch a dead body," was the reply.

"What! is he dead?"

"Reckon he is that."

We examined the body, and found life in it. He was a poorly-dressed man, seemingly in hard luck, and for the matter of that so was the other.

"I think," said the stranger who had stopped the train, "that he's taken pizen and laid down here to make sure work of it. If you are a mind to take him on to Centralia I'll kind o' rub him into life and get a doctor to pump him out."

The conductor assented, and we lugged the body into the baggage car. The case created considerable talk among the passengers, and a purse of $7 was made up for the unfortunate. However, as we slowed up for Centralia, and before the purse was presented, there was a great yelling from the baggage car, and we looked out to see the two tramps dusting it across a field. It was a game they had played to get a 20 mile lift.—*Detroit Free Press.*

### A Suspicious Person.

A young man entered a railroad car, and hadn't been seated very long before he became an object of general attention.

"I wonder who he is?" said one passenger to another, "he is a fine-looking young fellow."

"Do you think so?" was the reply. "I should be afraid to trust him. He looks snaky."

From another seat came a whispered warning, "Look out for him; he is doubtless a pickpocket." And another expressed opinion was to the effect that he was "certainly a confidence man at the very least."

The conductor came through the car and watched him suspiciously while demanding his fare, and then directed the brakeman to keep a sharp eye out for him.

The young man left the car at the next stopping place, and the passengers settled back in their seats with a sense of relief.

Reader, he had simply taken a Bible from the Young Men's

## RAILROAD EARNINGS IN JANUARY.

| NAME OF ROAD. | MILEAGE. | | | | | EARNINGS. | | | | | EARNINGS PER MILE. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1885. | 1884. | Inc. | Dec. | P. c. | 1885. | 1884. | Inc. | Dec. | P. c. | 1885. | 1884. | Inc. | Dec. | P. c. |
| **EASTERN ROADS.** | | | | | | | | | | | | | | | |
| Boston, Hoosac Tun. & West. | 87 | 87 | .... | .... | .... | $ 32,222 | $ 25,843 | $ 6,379 | .... | 24.5 | $ 370 | $ 297 | $ 73 | .... | 24.5 |
| Grand Trunk | 2,918 | 2,794 | 124 | .... | 4.4 | 1,113,621 | 1,153,615 | .... | 39,994 | 3.5 | 382 | 413 | .... | 31 | 7.7 |
| Long Island | 354 | 354 | .... | .... | .... | 150,435 | 135,612 | 14,823 | .... | 10.9 | 425 | 383 | 42 | .... | 10.9 |
| N. Y. & New England | 400 | 400 | .... | .... | .... | 230,420 | 243,046 | .... | 12,626 | 5.2 | 576 | 608 | .... | 32 | 5.2 |
| N. Y., Ontario & Western | 373 | 373 | .... | .... | .... | 128,330 | 121,369 | 6,961 | .... | 5.8 | 344 | 325 | 19 | .... | 5.8 |
| N. Y., Sus. & Western | 147 | 147 | .... | .... | .... | 70,665 | 64,055 | 6,610 | .... | 10.3 | 481 | 434 | 47 | .... | 10.3 |
| Northern Central | 323 | 323 | .... | .... | .... | 404,216 | 409,846 | .... | 5,630 | 1.4 | 1,251 | 1,269 | .... | 18 | 1.4 |
| Pennsylvania* | 2,150 | 2,070 | 80 | .... | 3.9 | 3,277,532 | 3,574,233 | .... | 296,711 | 8.4 | 1,524 | 1,727 | .... | 203 | 11.9 |
| Philadelphia & Reading† | 1,560 | 1,560 | .... | .... | .... | 1,846,366 | 2,195,800 | .... | 349,434 | 15.9 | 1,188 | 1,408 | .... | 220 | 15.9 |
| Rochester & Pittsburgh | 294 | 294 | .... | .... | .... | 84,651 | 68,200 | 16,451 | .... | 24.2 | 288 | 232 | 56 | .... | 24.2 |
| West Jersey | 195 | 188 | 7 | .... | 3.7 | 70,120 | 69,300 | 820 | .... | 1.2 | 360 | 369 | .... | 9 | 2.4 |
| Total, 11 roads | 8,801 | 8,590 | 211 | .... | .... | 7,408,568 | 8,060,919 | 52,044 | 704,395 | .... | 842 | 938 | .... | 98 | .... |
| Total inc. or dec | .... | .... | 211 | .... | 2.5 | .... | .... | .... | 652,351 | 8.1 | .... | .... | .... | 96 | 10.2 |
| **SOUTHERN ROADS.** | | | | | | | | | | | | | | | |
| Alabama Great Southern | 290 | 290 | .. | .... | .. | 104,791 | 88,313 | 16,478 | .... | 18.7 | 361 | 304 | 57 | .... | 18.7 |
| Chesapeake & Ohio | 517 | 517 | .... | .. | .. | 288,177 | 280,621 | 7,556 | .... | 2.7 | 557 | 544 | 13 | .... | 2.7 |
| Eliz., Lex. & Big Sandy | 130 | 130 | .... | .. | .. | 52,728 | 47,388 | 5,340 | .... | 11.3 | 406 | 365 | 41 | .... | 11.3 |
| Ches., Ohio & Southwestern | 399 | 399 | .... | .... | .... | 113,555 | 104,694 | 8,861 | .... | 8.4 | 285 | 262 | 23 | .... | 8.4 |
| Cin., N. O. & Tex. Pacific | 336 | 336 | .. | .... | .. | 201,647 | 182,809 | 18,839 | .... | 10.3 | 600 | 544 | 56 | .... | 10.3 |
| Fla. Ry. & Nav. Co. | 528 | 477 | 51 | .... | 10.7 | 96,491 | 92,198 | 4,293 | .... | 4.6 | 183 | 193 | .... | 10 | 5.2 |
| Ill. Cen., Southern Div. | 711 | 578 | 133 | .... | 23.0 | 396,700 | 338,041 | 58,659 | .... | 17.3 | 558 | 585 | .... | 27 | 4.6 |
| Kentucky Central | 254 | 220 | 34 | .... | 15.5 | 57,117 | 51,798 | 5,319 | .... | 10.2 | 225 | 235 | .... | 10 | 4.2 |
| Louisville & Nash | 2,065 | 2,065 | .. | .... | .... | 1,165,735 | 1,039,317 | 126,418 | .... | 12.2 | 565 | 503 | 62 | .... | 12.2 |
| Mobile & Ohio | 528 | 528 | .... | .... | .... | 207,640 | 179,228 | 28,412 | .... | 15.8 | 393 | 339 | 54 | .... | 15.8 |
| Nashville, Chatta. & St. L. | 574 | 554 | 20 | .... | 3.6 | 184,986 | 186,992 | .... | 2,006 | 1.1 | 322 | 338 | .... | 16 | 4.7 |
| N. Orleans & Northeastern | 195 | 195 | .... | .... | .... | 54,719 | 35,738 | 18,981 | .... | 52.8 | 281 | 183 | 98 | .... | 52.8 |
| Norfolk & Western | 512 | 503 | 9 | .... | 1.8 | 230,350 | 213,020 | 17,330 | .... | 8.0 | 450 | 423 | 27 | .... | 6.3 |
| Rich. & Danville | 757 | 757 | .. | .... | .... | 325,653 | 266,889 | 58,764 | .... | 22.0 | 430 | 353 | 77 | .... | 22.0 |
| Char., Col. & Augusta | 370 | 339 | 31 | .... | 9.1 | 80,494 | 65,376 | 15,118 | .... | 23.2 | 218 | 193 | 25 | .... | 13.1 |
| Col. & Greenville | 296 | 296 | .... | .... | .... | 72,343 | 56,646 | 15,697 | .... | 27.5 | 244 | 191 | 53 | .... | 27.5 |
| Georgia Pacific | 318 | 288 | 30 | .... | 10.4 | 60,528 | 46,052 | 14,476 | .... | 31.5 | 191 | 160 | 31 | .... | 19.4 |
| Virginia Midland | 352 | 352 | .... | .... | .... | 106,004 | 107,115 | .... | 1,111 | 1.0 | 301 | 304 | .... | 3 | 1.0 |
| Western N. Carolina | 280 | 228 | 52 | .... | 22.8 | 34,911 | 29,212 | 5,699 | .... | 19.7 | 125 | 128 | .... | 3 | 2.4 |
| Shenandoah Valley | 250 | 249 | 1 | .... | 0.4 | 46,215 | 56,254 | .... | 10,039 | 17.9 | 185 | 226 | .. | 41 | 18.2 |
| Vicksburg & Meridian | 142 | 132 | .. | .... | .... | 42,280 | 43,323 | .... | 1,043 | 2.4 | 298 | 305 | .... | 7 | 2.4 |
| Total, 21 roads | 9,804 | 9,443 | 361 | .. | .... | 3,923,064 | 3,511,024 | 426,239 | 14,199 | .... | 400 | 373 | 27 | .... | .... |
| Total inc. or dec | .... | .... | 461 | .... | 3.8 | .... | .... | 412,040 | .... | 11.7 | .... | .... | 27 | .... | 7.3 |
| **CENTRAL GROUP.** | | | | | | | | | | | | | | | |
| Chi. & Eastern Ill. | 252 | 252 | .... | .... | .... | 125,333 | 125,424 | .... | 91 | 0.1 | 497 | 497 | .... | .... | .... |
| Chi. & West Michigan | 415 | 410 | .... | .... | .... | 73,942 | 105,427 | .... | 31,485 | 29.9 | 180 | 257 | .... | 77 | 29.9 |
| Cin., Ind., St. L. & Chicago | 342 | 342 | .... | .... | .... | 200,427 | 170,318 | 30,109 | .... | 17.7 | 586 | 498 | 88 | .... | 17.7 |
| Cin., Wash. & Baltimore | 284 | 284 | .... | .... | .... | 155,654 | 145,651 | 10,003 | .... | 6.9 | 548 | 513 | 35 | .... | 6.9 |
| Cleve., Akron & Columbus | 144 | 144 | .... | .... | .... | 31,791 | 31,562 | 229 | .... | 0.7 | 221 | 219 | 2 | .... | 0.7 |
| Connotton Valley | 161 | 161 | .... | .... | .... | 20,168 | 23,193 | .... | 3,025 | 13.2 | 125 | 144 | .... | 19 | 13.2 |
| Detroit, Lansing & No. | 258 | 258 | .... | .... | .... | 68,783 | 85,854 | .... | 17,071 | 19.9 | 267 | 333 | .... | 66 | 19.9 |
| Evansville & Terre Haute | 146 | 146 | .... | .... | .... | 53,001 | 44,165 | 8,836 | .... | 20.0 | 363 | 303 | 60 | .... | 20.0 |
| Flint & Pere Marquette | 362 | 362 | .... | .... | .... | 144,329 | 186,449 | .... | 42,120 | 22.7 | 399 | 515 | .... | 116 | 22.7 |
| Illinois Central, Ill. lines | 953 | 953 | .... | .... | .... | 488,500 | 488,531 | .... | 31 | .... | 513 | 513 | .... | .... | .... |
| Ind., Bloom. & West. | 696 | 696 | .... | .... | .... | 198,036 | 198,685 | .... | 649 | 0.3 | 285 | 286 | .... | 1 | 0.3 |
| Ohio Central | 212 | 212 | .... | .... | .... | 79,804 | 87,260 | .... | 7,456 | 8.5 | 378 | 412 | .... | 34 | 8.5 |
| Ohio Southern | 130 | 130 | .... | .... | .... | 45,109 | 36,973 | 8,136 | .... | 22.0 | 347 | 284 | 63 | .... | 22.0 |
| Peoria, Decatur & Ev. | 254 | 254 | .... | .... | .... | 64,271 | 64,732 | .... | 461 | 0.7 | 253 | 255 | .... | 2 | 0.7 |
| St. L., Alton & Terre Haute: | | | | | | | | | | | | | | | |
| Main Line | 195 | 195 | .... | .... | .... | 95,042 | 114,443 | .... | 19,401 | 17.0 | 487 | 587 | .... | 100 | 17.0 |
| Belleville Line | 138 | 138 | .... | .... | .... | 57,119 | 65,525 | .... | 8,406 | 12.8 | 414 | 475 | .... | 61 | 12.8 |
| Tol., Ann Arbor & N. Mich. | 61 | 61 | .. | .... | .... | 24,050 | 15,760 | 8,290 | .... | 52.6 | 394 | 258 | 136 | .... | 52.6 |
| Wabash, St. L. & Pacific | 3,549 | 3,647 | .... | 98 | 2.7 | 1,309,564 | 1,251,083 | 58,481 | .... | 4.7 | 369 | 343 | 26 | .... | 7.6 |
| Total, 18 roads | 8,547 | 8,645 | .... | 98 | .... | 3,234,923 | 3,241,035 | 124,084 | 130,196 | .... | 378 | 375 | 3 | .... | .... |
| Total inc. or dec | .... | .... | .... | 98 | 1.1 | .... | .... | .... | 6,112 | 0.2 | .... | .... | 3 | .... | 0.8 |
| **NORTHWESTERN ROADS.** | | | | | | | | | | | | | | | |
| Bur., Cedar Rap. & No. | 888 | 714 | 174 | .... | 24.7 | 223,719 | 213,863 | 9,856 | .... | 4.6 | 252 | 299 | .... | 47 | 15.7 |
| Central Iowa | 500 | 500 | .... | .... | .... | 85,646 | 110,918 | .... | 25,272 | 22.7 | 171 | 222 | .... | 51 | 22.7 |
| Chi. & Alton | 850 | 850 | .... | .... | .... | 644,387 | 666,642 | .... | 22,255 | 3.5 | 758 | 784 | .... | 26 | 3.5 |
| Chi., Mil. & St. Paul | 4,800 | 4,760 | 40 | .... | 0.8 | 1,518,000 | 1,467,096 | 50,904 | .... | 3.5 | 316 | 308 | 8 | .... | 2.9 |
| Chi. & Northwestern | 3,900 | 3,800 | 100 | .... | 2.6 | 1,498,100 | 1,502,418 | .... | 4,318 | 0.3 | 384 | 395 | .... | 11 | 2.8 |
| Chi., St. P., Minn. & Omaha | 1,300 | 1,280 | 20 | .... | 1.6 | 334,700 | 350,609 | .... | 15,909 | 4.5 | 257 | 273 | .... | 16 | 5.9 |
| Des Moines & Ft. Dodge | 138 | 138 | .... | .... | .... | 25,211 | 26,484 | .... | 1,273 | 4.8 | 183 | 192 | .... | 9 | 4.8 |
| Green Bay, Win. & St. P. | 220 | 220 | .... | .... | .... | 21,460 | 30,109 | .... | 8,649 | 28.8 | 98 | 137 | .... | 39 | 28.8 |
| Ill. Central, Iowa lines | 402 | 402 | .... | .... | .... | 104,300 | 131,512 | .... | 27,212 | 20.6 | 259 | 327 | .... | 68 | 20.6 |
| Marquette, H. & Ont. | 138 | 103 | 35 | .... | 34.0 | 15,720 | 20,080 | .... | 4,386 | 21.8 | 114 | 195 | .... | 81 | 41.5 |
| Mil., Lake Shore & West. | 470 | 326 | 144 | .... | 43.7 | 72,605 | 69,705 | 2,900 | .... | 4.1 | 154 | 214 | .... | 60 | 28.0 |
| Wisconsin Central | 440 | 440 | .... | .... | .... | 102,338 | 117,895 | .... | 15,557 | 13.2 | 233 | 268 | .. | 35 | 13.2 |
| Total, 12 roads | 14,046 | 13,533 | 513 | .... | .... | 4,646,186 | 4,707,331 | 63,660 | 124,805 | .... | 331 | 348 | .... | 17 | .... |
| Total inc. or dec | .... | .... | 513 | .... | 3.8 | .... | .... | .... | 61,145 | 1.3 | .... | .... | .... | 17 | 4.9 |
| **ROADS NORTHWEST OF ST. PAUL.** | | | | | | | | | | | | | | | |
| Canadian Pacific | 2,794 | 1,931 | 863 | .... | 45.2 | 392,000 | 261,000 | 131,000 | .... | 50.2 | 140 | 135 | 5 | .... | 3.7 |
| Northern Pacific | 2,453 | 2,449 | 4 | .... | 0.2 | 556,092 | 614,103 | .... | 58,011 | 9.4 | 227 | 251 | .... | 24 | 9.6 |
| St. P. & Duluth | 227 | 227 | .... | .... | .... | 79,860 | 71,494 | 8,366 | .... | 11.7 | 352 | 315 | 37 | .... | 11.7 |
| St. P., Minn. & Manitoba | 1,397 | 1,327 | 70 | .... | 5.3 | 466,125 | 449,307 | 16,818 | .... | 3.9 | 334 | 339 | .... | 5 | 1.5 |
| Total, 4 roads | 6,871 | 5,934 | 937 | .... | .... | 1,494,077 | 1,395,904 | 156,184 | 58,011 | .... | 217 | 235 | .. | 18 | .... |
| Total inc. or dec | .... | .... | 937 | .... | 15.8 | .... | .... | 98,173 | .... | 7.0 | .... | .... | .... | 18 | 7.7 |
| **SOUTHWESTERN ROADS.** | | | | | | | | | | | | | | | |
| Fort Worth & Denver | 110 | 110 | .... | .... | .... | 22,264 | 24,896 | .... | 2,632 | 10.5 | 202 | 226 | .... | 24 | 10.5 |
| Gulf, Colorado & Santa Fe. | 536 | 536 | .... | .... | .. | 92,332 | 138,414 | .... | 46,082 | 33.4 | 172 | 258 | .... | 86 | 33.4 |
| Kan. City, Ft. Scott & Gulf. | 389 | 389 | .... | .... | .... | 213,990 | 192,887 | 21,103 | .... | 10.9 | 550 | 496 | 54 | .... | 10.9 |
| Kan. City, Sp'f'd & Memp. | 282 | 282 | .... | .... | .. | 148,929 | 71,198 | 77,731 | .... | 109.2 | 528 | 252 | 276 | .... | 109.2 |
| St. L., Ft. Scott & Wichita | 182 | 160 | 22 | .... | 13.7 | 33,215 | 34,905 | .... | 1,690 | 5.8 | 183 | 218 | .... | 35 | 15.9 |
| St. L. & San Francisco | 804 | 750 | 54 | .... | 7.2 | 315,933 | 319,926 | .... | 3,993 | 1.2 | 393 | 427 | .... | 34 | 8.3 |
| Texas & St. Louis | 735 | 735 | .... | .... | .... | 63,281 | 69,882 | .... | 6,601 | 9.4 | 86 | 95 | .... | 9 | 9.4 |
| Vicks., Shreveport & P. | 170 | 95 | 75 | .... | 78.9 | 29,901 | 12,483 | 17,418 | .... | 124.2 | 176 | 132 | 44 | .... | 33.3 |
| Total, 8 roads | 3,208 | 3,057 | 151 | .... | .... | 919,845 | 864,591 | 116,252 | 60,998 | .... | 287 | 283 | 4 | .... | .... |
| Total inc. or dec | .... | .... | 151 | .... | 4.9 | .... | .... | 55,254 | .... | 6.4 | .... | .... | 4 | .... | 1.5 |
| **FAR WESTERN AND PACIFIC ROADS.** | | | | | | | | | | | | | | | |
| Central Pacific | 2,802 | 3,003 | .... | 201 | 6.7 | 1,647,000 | 1,449,785 | 197,215 | .... | 13.6 | 588 | 483 | 105 | .... | 21.7 |
| Denver & Rio Grande ‡ | 1,317 | 1,317 | .. | .... | .... | 390,401 | 399,886 | .... | 9,485 | 2.3 | 296 | 304 | .. | 8 | 2.3 |
| Utah Central | 280 | 280 | .... | .... | .... | 85,069 | 75,283 | 9,786 | .... | 13.0 | 304 | 269 | 35 | .... | 13.0 |
| Total, 3 roads | 4,399 | 4,600 | .... | 201 | .... | 2,122,470 | 1,924,954 | 207,001 | 9,485 | .... | 482 | 418 | 64 | .... | .... |
| Total inc. or dec | .... | .... | .... | 201 | 4.4 | .... | .... | 197,516 | .... | 10.3 | .... | .... | 64 | .... | 15.3 |
| GRAND TOTAL: | | | | | | | | | | | | | | | |
| Total, 77 roads | 55,976 | 53,802 | 2,173 | 299 | .... | 23,749,133 | 23,705,758 | 1,145,464 | 1,102,089 | .... | 427 | 441 | .... | 14 | .... |
| Total inc. or dec | .... | .... | 1,874 | .... | 3.5 | .... | .... | 43,375 | .... | 0.2 | .... | .... | .... | 14 | 3.2 |

* Includes all lines east of Pittsburgh and Erie.
† Includes New Jersey Central in both years.
‡ Does not include Utah lines.

Christian Association rack, and after wiping three or four years' dust off the covers, began reading it.—*Travelers' Record.*

### Drinking Locomotive Engineers.

As a class, railroad engineers in active service are exceptionally temperate men. The daily performance of their duty requires a clear brain and steady nerve, which is very soon broken up by any use of alcohol.

The nerve tension to which they are subjected in active work produces after a time many and profound nerve disorders. One of the hints of breaking down in this class is excessive caution and timidity. Often men who have had an accident and escaped without any external injury will soon exhibit signs of mental shock, in what is called loss of nerve or childish caution. Their trains will always be late, they will "slow down" and slacken speed from no reason except some internal fears, and have to be changed to other work. Insomnia and dyspepsia are also common signs of exhaustion. After the day's run they will be unable to sleep or properly digest food, and alcohol in some form will be found to give relief. This will soon verge into inebriety, and the drinking will be confined to the hours after the work is over. During the day they drink nothing, except, perhaps, beer, and that in great moderation; but when night comes they use spirits to excess again. After a time such men will show marks of failure in excessive caution or recklessness, and be very irregular in their management of the engine. They will have heated journals and broken engines beyond the average experience.

These and many other indications soon render them unfit for the work. It is the opinion of a competent authority that an engineer who begins to drink will be, as a rule, obliged to give up work in two years from general incompetency, although his use of spirits may be at home and largely concealed, and what is called general moderation. A fact has recently come to my notice with its explanation that is of unusual interest. On a through line running out from New York it has been observed that nearly all the engineers who were changed and discharged for drinking were on the night trains, and were considered the most competent. The conclusion was that men on these night runs were more likely to drink, and the individual opinions of railroad managers agree on this point.—*Medical and Surgical Reporter.*

### A Terrible Accident.

About 6 o'clock on the evening of Saturday, Feb. 28, as two extra freights on the Corning, Cowanesque & Antrim road were going down a grade three miles south of Tioga, Pa., the leading section parted. The rear portion was brought to a standstill by the use of the brakes, and a flagman was about to be sent back, but the train following was so close that it was impossible to stop. In the leading train and near the caboose was a car containing 410 kegs of powder, or a little more than 10 tons. The trainmen knew of the presence of the explosive, and when they saw that a crash was inevitable, jumped for the ditches on either side of the track, and threw themselves on their faces. The caboose of the leading train was demolished by the locomotive of the rear train, and the car of powder was struck with irresistible force. There was instantly a terrific explosion, the noise of which was heard in Elmira, over 25 miles away. The locomotive and many cars—about 17—were blown to fragments. The cars were loaded with miscellaneous freight, which was spread far and wide. The force of the explosion was greatly augmented by the bursting of the boiler. The fragments of the locomotive were thrown great distances. A section of the boiler was found about a mile from the scene of the disaster. The men who escaped so miraculously were Conductor Stahl and his brakeman of the forward train, and Conductor Cook, Engineer Husted and his fireman of the rear train. The track and road-bed were torn up by the immense force of the explosion and trees near by were splintered. The branches of others were hung as if they were Christmas trees, with suits of ready-made clothing and other articles which happened to be among the freight of the train. Windows in buildings in the vicinity of the explosion were shattered, and there was general consternation among the people of Tioga County until it was learned what was the cause of the disturbance, so much resembling an earthquake.

### Running on Three Wheels.

When Erie freight No. 36 reached Middletown Tuesday, the startling discovery was made that a part of one of the wheels on a loaded car was missing. It was not known at what point the break occurred, nor could any trace of the missing portion of the wheel be found. The car did not seem to bound much as the other wheels relieved the weight. The discovery was very fortunate. The crippled car was switched. Nearly a year ago a somewhat similar accident happened on the Susquehanna Division of the Erie to one of the locomotives drawing a passenger train. After the engine was placed in the round-house, the discovery was made that the forward pony wheel on the left-hand side was missing. It was afterward found alongside the track some distance up the division, having run across the westward-bound track and imbedded itself in the loose earth near by. The engine was supplied with a safety chain, which supported the weight and kept the broken axle from dropping to the track. Neither the engineer nor fireman experienced any jar by the breaking of the wheel, and the discovery was made by the wipers after she was housed.—*Port Jervis (N. Y.) Gazette.*

### Too Much Culture.

Out on the Burlington & Missouri River Railroad in Nebraska, they imported a passenger brakeman from Boston. There is a heap of Boston talent on the Burlington & Missouri, but this young man was refined until he was about 120 proof. He ran on the Beatrice Branch, which everybody in Nebraska knows is called to rhyme with "the mattress." And when this new man looked in at the car door and shouted "Bay-ah-treet-chee! Bay-ah-treet-chee!" the entire community rose up as one man and piled on to him by thousands. Thanks to the severity of the weather, his remains reached Tremont street in a state of excellent preservation.—*Burdette in Brooklyn Eagle.*

### The Canajoharie Accident.

In the case of the collision at Canajoharie, N. Y., Feb. 21, on the New York, West Shore & Buffalo road, in which four engines were wrecked, and two trainmen killed, the coroner's jury has returned the following verdict:

"That Andrew Shiner and Grover Penny came to their death on the 21st day of February, at the town of Canajoharie, from injuries received in consequence of a collision on the West Shore Railroad between three engines drawing train No. 57, and engine No. 122, freight train No. 126, lying on the east-bound track just east of the village of Canajoharie. The jury further, upon oath, exonerates from all blame the enginemen, firemen and conductor of said train No. 57. They further say that said accident was caused by the neglect of the train dispatcher at Syracuse to notify the night operator at Canajoharie, and the men in charge of trains Nos. 122 and 126 that he had ordered train No. 57 to take the east-bound track, running west, between Fultonville and Canajoharie; and also from the neglect of the night operator at Canajoharie to notify the dispatcher of the crossing of trains Nos. 122 and 126 from track to track several times,

and the said trains Nos. 122 and 126 had improperly passed the semaphore at Canajoharie and were lying east of the station and of the red light; and also that the conductor and enginemen of said train No. 126 had improperly passed the red light eastward at Canajoharie without express orders. While all these said persons are included in the censure of the jury, they especially censure the officers of said West Shore Railroad Co. in that they have failed to furnish and provide proper and sufficient side tracks at Canajoharie to allow the laying off of those trains necessarily detained at said station, and further for allowing the habitual violation of rules or orders and neglect of obviously proper and necessary precautions for safety, which has been practiced and allowed at said station."

### Stevens Institute Equations.

"For the benefit of those reciting on Materials of Engineering, we publish the following as a mathematically correct conclusion from the statement of Professor Thurston, that: The Factor of Safety is a Factor of Ignorance. Hence we have:

Factor of Safety = Factor of Ignorance.
Safety = Ignorance,
hence, Safe = Ignorant,—and
A safe man in Materials of Engineering = an ignorant man in M. of E. But a man safe in M. of E. = a man safe to pass in M. of E.

Axiom: two things equal to the same thing are equal to each other.

∴ A student ignorant in Materials of Engineering is safe to pass in it.—*Stevens Institute Indicator.*

## ANNUAL REPORTS.

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### Pennsylvania Railroad.

The annual report of this company for 1884 covers in the first place the lines worked directly, which are as follows:

1. The Pennsylvania Railroad Division, including the main line from Philadelphia to Pittsburgh, 358 miles, with 1,113 miles of branches, a total of 1,471 miles, being an increase of 157 miles of branches.

2. The United Railroads of New Jersey Division, including the main line from Jersey City to Philadelphia, 89 miles, and 354 miles of branches, an increase of 8 miles; the ferries over the Hudson and Delaware rivers; the Delaware & Raritan Canal, 66 miles, a total of 443 miles of railroad and 66 miles of canal.

3. The Philadelphia & Erie Division, a main line from Sunbury, Pa, to Erie, 288 miles.

Making in all 2,202 miles of railroad (an increase of 55 miles) and 66 miles of canal, the earnings whereof were as follows:

I. PENNSYLVANIA RAILROAD DIVISION.

| | 1884. | 1883. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Earnings | $30,196,885 | $32,017,813 | D. $1,820,928 | 5.7 |
| Expenses | 17,575,106 | 18,321,413 | D. 746,307 | 4.1 |
| Net earnings | $12,621,779 | $13,696,400 | D. $1,074,621 | 7.8 |
| Gross earn. pr. mile. | 21,724 | 24,820 | D. 3,096 | 12.5 |
| Net " " | 9,080 | 10,617 | D. 1,537 | 14.5 |
| Per cent. of exps. | 58.2 | 57.2 | I. 1.0 | ... |
| Net earnings as above | | | | $12,621,779 |
| Interest on investments, etc | | | | 4,489,774 |
| Total | | | | $17,111,553 |
| Rentals, interest, etc. | | | | 6,926,023 |
| Net income, Pa. R. R. Division | | | | $10,185,530 |

II. UNITED NEW JERSEY.

| | 1884. | 1883. | Inc. or Dec. | P.c. |
|---|---|---|---|---|
| Earnings | $14,709,887 | $14,956,595 | D. $246,708 | 1.7 |
| Expenses | 10,749,844 | 10 804,913 | D. 55,069 | 0.5 |
| Net earnings | $3,960,043 | $4,151,682 | D. $191,639 | 4.6 |
| Gross earn. per mile | 29.419 | 29,913 | D. 494 | 1 7 |
| Net " " | 7,920 | 8,303 | D. 383 | 4.7 |
| Per cent. of exps. | 73.1 | 72.2 | I. 0.9 | ... |
| Net earnings, as above | | | | $3,960,043 |
| Interest on investments | | | | 352,177 |
| Total | | | | $4,312,220 |
| Interest, rentals, dividends, etc | | | | 4,905,757 |
| Net loss on lease | | | | $593,537 |

III. PHILADELPHIA & ERIE.

| | 1884. | 1883. | Inc. or Dec. | P.c. |
|---|---|---|---|---|
| Earnings | $3,660,146 | $4,108.843 | D. $448,697 | 10 9 |
| Expenses | 2,202,066 | 2,620,823 | D. 418,757 | 16.0 |
| Net earnings | $1,458,080 | $1,488,020 | D. $29,940 | 2.0 |
| Gross earn. per mile | 12,709 | 14,267 | D. 1,558 | 10.9 |
| Net " " | 5,063 | 5,167 | D. 104 | 2.0 |
| Per cent. of exps. | 60.2 | 63.8 | D. 3.6 | ... |
| Net earnings, as above | | | | $1,458,080 |
| Interest on equipment | | | | 166,801 |
| Balance, paid Phila. & Erie Co. as rental | | | | $1,291,279 |

GENERAL INCOME ACCOUNT.

The general statement of income for the year was as follows:

| | | |
|---|---|---|
| Net earnings Pennsylvania R. R. Div | | $10,185,530 |
| Less loss on United N. J. lease | | 593,533 |
| Balance | | $9,591,993 |
| Fund for purchase of securities | $600,000 | |
| Consol. mortgage sinking fund | 277,460 | |
| All. Valley, deficiency on guarantees | 698,320 | |
| Frederick & Pa. Line, advances | 15,000 | |
| | | 1,590,780 |
| Net balance | | $8,001,213 |
| Dividends, 7 per cent | | 6,560.788 |
| Balance to profit and loss | | $1,440,425 |
| Balance Dec. 31, 1889 | $13,613.184 | |
| Less accounts settled and charged off | 1,020,691 | |
| | | 12,592,493 |
| Balance, Dec. 31, 1884 | | $14,032,918 |

President Roberts' report says: "The securities of branch and auxiliary lines now owned by the company amount at their par value to $128,058,846, and are represented on the books at a cost of $96,866,516. The income derived therefrom during the year amounted to $3,956,374, which, with $126,473 derived from the general interest account, made $4,082,848, which sum was $73,940 in excess of the interest upon your entire funded indebtedness, exclusive of interest on car trust certificates.

"The marked decrease in the gross and net earnings of these three divisions during 1884 is due entirely to the reduction in the rates received for transportation, the volume of tonnage moved and the number of passengers carried being greater than in the previous year. This reduction in rates has been caused by the severe depression in the manufacturing and mining interests of the country, upon the prosperous condition of which the revenues of your lines so largely depend. In addition to this cause the unnecessary construction of new and competitive lines within the past few years has further divided the volume of traffic which was naturally tributary to the old roads, while the financial necessities of such new enterprises have forced them into destructive competition with the better established lines.

"The increased volume of your tonnage is due entirely to your local traffic, as it will be noted that there was a reduction in the amount of through business, while each year the local traffic represents a constantly increasing proportion of the aggregate tonnage, until it has now reached about 92 per cent. thereof. This result should be especially gratifying to the shareholders, and is the natural outgrowth of the liberal expenditures made by your company for developing the local interests dependent upon your lines.

"Although the large increase of traffic upon the Main Line produced less gross revenue, the expenses were kept materially below those of the previous year, and to these economies must be attributed the comparatively favorable results upon that division. It will be noted that the net loss to your company from the lease of the United Railroads of New Jersey was less than in the previous year.

"On the Philadelphia & Erie Division the reduction in expenses nearly overcame the loss in gross revenue, and the net result for the year is satisfactory; that company having been able to meet all its fixed charges, and pay a portion of the interest unprovided for in previous years.

CONSTRUCTION AND CAPITAL ACCOUNTS.

"There has been expended for construction, equipment, and real estate as follows:

| | | |
|---|---|---|
| Pennsylvania Railroad and branches | | $1,140.399 |
| United Railroads of New Jersey | | 156,613 |
| Philadelphia & Trenton Railroad | | 154,902 |
| Total | | $1,451.914 |
| Improvements and extensions on branch and auxiliary lines operated | $820,923 | |
| Advances on account of construction of new branch and auxiliary lines | 4,520,861 | |
| Total | $5,341,784 | |
| On account of these advances there has been received from some of the companies in cash | 1,000,546 | |
| | | 4,341,238 |
| Total amount expended on capital account in 1884 | | $5,793,152 |

"On account of the above advances to branch and auxiliary lines there have been received in securities of those companies $3,954,526.

"The funds for these expenditures were obtained from the cash balance of the previous year, from the privilege accorded to stockholders of taking new stock for a portion of their dividend, and from the sale of $3,000,000 of collateral trust loan, bearing 4½ per cent. interest per annum.

"The expenditures for branches and auxiliary lines form a large proportion of the capital you are annually called upon to provide; but the wisdom of extending such lines cannot be called in question, when, notwithstanding the severe commercial depression before alluded to, your main lines increased their volume of tonnage over that of any previous year.

"The debt due to the state of Pennsylvania on account of the purchase of the Main Line was reduced during the year by the payment of $315,090, which was charged to capital account. The balance of the annual payment of $460,000 ($141,910), representing the interest upon the amount due to the state, was charged directly to income account. The balance due on account of the purchase of the Main Line is $2,660,913.

"Under the provisions of the consolidated mortgage of the company, there was set apart, on July last, out of the net income, the sum required for the purchase of outstanding bonds secured by that mortgage, and entitled to the security of the covenants therein, in relation to the sinking fund. Bonds to the par value of $277,460 were thus purchased, and, after being canceled, were delivered to the trustees under the stipulations of the said mortgage. The amount of bonds so purchased to date is $1,767,070 at their par value.

"There are now in the sinking fund, for the redemption of the obligations of the various companies forming the United New Jersey Railroad & Canal Co., securities of the par value of $3,131,900. There is also a cash balance, uninvested by the trustees, of $4,711, making an aggregate investment of $3,136,611, for which you will in the future, in accordance with the terms of the lease, receive bonds to be issued under the general mortgage of that company.

"The sinking fund for the redemption of the trust certificates issued for the purchase of the shares of the capital stock of the Philadelphia, Wilmington & Baltimore Railroad Co. was sufficient to enable the trustees to purchase $409,000 of such certificates during the past year. These certificates have been canceled, as provided in the trust agreement. The total amount of these certificates purchased and canceled to Dec. 31, 1884, is $1,266,000.

"By the operation of the sinking fund $60,000 of the certificates of the collateral trust loan of your company have been redeemed and canceled, leaving $5,940,000 outstanding. The amount of the collateral trust loan authorized to be issued was $10,000,000, of which $6,000,000 have been disposed of, leaving a balance of $4,000,000 unsold.

"Further provision was made, under the system of car trusts, for the equipment of your roads, to the extent of 500 refrigerator and 500 hopper gondola cars for the Main Line, 500 long gondola cars for the lines of the Pennsylvania Co., and 700 hopper gondola cars sub-leased to the Northern Central Railway Co."

The cars bought under car trusts for the Main Line, the lines west of Pittsburgh and the controlled lines, number in all 30,996, representing a cost of $16,537,000, of which $8,340,000 had been paid up to Dec. 31 last, leaving $8,197,000 outstanding.

COMPARISONS.

The earnings and expenses of all lines east of Pittsburgh and Erie compare as follows:

| | Gross earnings. | Expenses. | Rental and interest on equipment. | Net earnings. |
|---|---|---|---|---|
| 1884 | $48,566,911 | $30,527,016 | $4,164,434 | $13,875,468 |
| 1883 | 51,083,252 | 31,747,150 | 3,805,702 | 15.530,400 |
| Increase | | | $358,732 | |
| Decrease | $2,516,334 | $1,220,134 | | $1,654,932 |

The gross earnings per mile of the main line (358 miles) were $67,161 against $74,638 in 1883.

TRAFFIC.

The following tables show the revenue and cost per passenger-mile and per ton-mile in cents, on each division:

| | Pennsylvania Branches. | United New Jersey. | Philadelphia & Erie. | All lines east of Pitts. and Erie. |
|---|---|---|---|---|
| *Passenger:* | | | | |
| Length of road (miles) | 1.471 | 443 | 288 | 2,202 |
| Av. earnings per passenger-mile | 2.422 | 2.058 | 2.749 | 2.258 |
| Av. cost per pass.-mile | 1 631 | 1.594 | 1.831 | 1.621 |
| Av. profit per pass.-mile | 0 791 | 0.464 | 0.918 | 0.637 |
| *Freight:* | | | | |
| Av. earn per ton-mile | 0.740 | 1.365 | 0.576 | 0.804 |
| Av. cost per ton-mile | 0.441 | 1.081 | 0.365 | 0.518 |
| Av. profit per ton-mile | 0 299 | 0.284 | 0.211 | 0.286 |

"From the above table it will appear that the average rate per ton-mile in 1884, on the Main Line and branches, shows a decrease, when compared with that of 1883, of 0.70 mill, and that the cost of transportation per ton-mile decreased 0.36 mill, showing a decrease of 0.34 mill in the profits per ton per mile.

"The rate received on the United Railroads of New Jersey Division shows a decrease of 1.06 mills, and the cost of moving a decrease of 0.86 mill, showing a decreased profit of 0.20 mill.

"In connection with the passenger business it may be stated that during 1884 there were handled on the three divisions east of Pittsburgh and Erie 1,737,358 pieces of baggage, as against 1,774,192 in 1883. The entire payments for lost and damaged baggage amounted to $1,355.

"The number of tons of freight moved over Main Line and branches, not including 1,189,183 tons of fuel and other material for the company's use, was 22,583,825 tons; for the previous year, 21,674,160 tons, showing an increase of 909,665 tons, or 4.2 per cent. There was an increase of 1,022,746 tons in local freight.

"Of the 22,583,825 tons of individual freight transported over Main Line and branches, 1,824,769 tons were through and 20,759,056 tons local freight.

"The coal shipments increased 1,164,727 tons, and the coke shipments decreased 291,274 tons; their aggregate being 13,300,341 tons, as against 12,426,888 tons in 1883—a gain of 873,453 tons.

"The east-bound coke tonnage from the Connellsville region shows an increase of 34,307 tons, and the west-bound a decrease of 367,527 tons; the entire movement of coke from that district amounting to 2,366,606 tons out of a total of 2,846,126 tons from all sources.

"The total shipments of oil during the year 1884 amounted to 3,281,889 barrels, as against 1,756,696 barrels in 1883, showing an increase of 1,525,193 barrels.

"On the Main Line the through freight shows a decrease in east-bound of 6.4 per cent., and west-bound 4.4 per cent., while the local freight eastward shows an increase of 6.9 per cent. and westward, 2.2 per cent.

"The number of passengers on the Main Line shows an increase of nearly 7 per cent.

"On the United Railroads of New Jersey there was a decrease in through freight, in both directions, of 170,500 tons, and an increase in local freight, in both directions, of 459,668 tons, making a total increase of 289,168 tons. The passenger traffic shows an increase of over 11 per cent. in the number carried.

"On the Philadelphia & Erie Division there was a decrease in the tonnage of through freight, in both directions, of 102,486 tons, and a decrease in local freight westward of 381,358 tons, but an increase in local freight eastward of 232,920 tons. The passenger traffic shows an increase of over 2 per cent. in the number carried.

RENEWALS.

"There were built at Altoona 61 locomotives for your Main Line and 20 for other roads in your interest. There were also constructed at that point 66 passenger cars, 896 freight cars and 138 cabin and maintenance of way cars for your Main Line, and 22 passenger cars, 950 car trust cars, 395 freight cars and 45 cabin and maintenance of way cars for your other lines and connections.

"At the West Philadelphia shops one baggage and two cabin cars were built, and at the Philadelphia & Erie shops, at Renova, 191 freight and 6 maintenance of way cars for your Main Line.

"There were used on the Main Line and branches, in construction and repairs, 25,517 tons of steel rails and 787,499 ties; on the Philadelphia & Erie Railroad, 1,593 tons of steel and 25,943 ties; and on the United Railroads of New Jersey, 4,768 tons of steel and 278,605 ties, making a total of 31,878 tons of steel and 1,092,047 ties.

COAL COMPANIES.

"The following table shows the gross earnings, expenses, and net earnings of the coal companies in which your company is interested, for 1884, as compared with 1883, and also the amount of coal mined:

| | Gross earnings, 1884. | Expenses, 1884. | Net earn., 1884. |
|---|---|---|---|
| Totals | $8,826.514 | $7.838,473 | $988,041 |
| Increase over previous year | 847,944 | 515,798 | 332,146 |

"Total tons mined in 1884, 2,250,089. Increase over previous year, 174,991 tons. The average price per ton at point of sale, aggregating the results of the four coal companies for 1884, was $3.77, as against $3.82, a decrease of 5 cents per ton.

"Owing to the construction of new and competitive outlets to western markets by some of the railroad companies which control the larger portion of this class of traffic, and the diversion thereto of coal formerly transported over your lines, your company has been compelled to increase its output of anthracite to supply the tonnage thus diverted, and also to further develop its coal properties to meet the traffic requirements of your lines.

LINES WEST OF PITTSBURGH.

"The following statement gives the result of the lines owned or controlled by the company west of Pittsburgh operated by the Pennsylvania Co. and the Pittsburgh, Cincinnati & St. Louis Railway Co.:

| | | |
|---|---|---|
| The total earnings of the Pennsylvania Co. on lines operated directly by it were | | $16,472.282 |
| Expenses for the same period were | | 10,844,960 |
| Leaving net earnings | | $5,627,322 |
| From this deduct: Rental, interest and liabilities of all kinds chargeable thereto | | 6,342,013 |
| Net loss on Pennsylvania Company's lines | | $714,68 |
| The total earnings of the Pittsburgh, Cincinnati & St. Louis Co. on lines operated directly by it were | $6,435,518 | |
| Expenses for the same period were | 4,716,548 | |
| Leaving net earnings | $1,718,970 | |
| From this deduct: Rental, interest and liabilities of all kinds chargeable thereto | 1,833,169 | |
| Net loss on P., C. & St. L. lines | | 114,199 |
| Net loss on lines west of Pittsburgh for 1884 | | $828.880 |
| Net profit on lines west of Pittsburgh for 1883 | | 823.896 |
| Decrease | | $1,652,77 |

"The other lines west of Pittsburgh, in connection with which the company has assumed liabilities, or which it controls through the ownership of securities, but which are worked through their own individual organizations, are the Chicago, St. Louis & Pittsburgh; St. Louis, Vandalia & Terre Haute; Grand Rapids & Indiana and roads operated through its organization, and East St. Louis & Carondelet.

| | |
|---|---|
| The aggregate gross earnings of these roads were | $8,481,895 |
| Expenses | 6,565,307 |
| Net earnings | $1,916,588 |
| Deduct rental and interest | 2,086,804 |
| Loss | $170,216 |

"Of this loss your company is directly or indirectly responsible for $33,010, making a total loss on all lines west of Pittsburgh of $861,891, against a net profit of $812,669 in 1883.

"Your lines west of Pittsburgh show a very marked decrease in both gross and net earnings. This is due not only to the falling off in the volume of traffic from causes already alluded to, but also to the very large reduction in rates, the result of severe competition for the decreased traffic.

"While the expenses were as far as possible reduced, it was not thought wise to permit any depreciation in the general condition of your properties, so that there was a loss in maintaining your entire western system, during 1884, of $861,891 as against a profit of $812,669 in 1883. The freight movement shows a decrease of 1,256,839 tons, and the passenger traffic a decrease of 72,384 in the number carried.

"Of the issue of $3,200,000 of the Pennsylvania Railroad Co.'s 6 per cent. bonds, secured by Pittsburgh, Fort Wayne & Chicago stock as collateral, $756,000 have been redeemed through the operation of the sinking fund, leaving the amount outstanding $2,444,000. During the year there were sold at favorable rates $1,250,000 of the Pennsylvania Co. 4½ per cent. bonds, making the entire issue of that series $13,750,000. The proceeds of the $1,250,000 bonds were used to redeem $1,000,000 of the 8 per cent. equipment bonds of the Pittsburgh, Fort Wayne & Chicago Co., which fell due March 1, 1884, and to provide the necessary capital for the betterment of your western system.

"The Grand Rapids & Indiana Railroad Co. was able during the past year to earn sufficient to provide for all its fixed liabilities, and your company was not called upon to make any advances to that company.

"The suit referred to in the last report as having been instituted against the Grand Rapids & Indiana Co. for a proper adjustment of the claims held by your company and the Pennsylvania Co. has been brought to an amicable settlement, by which your company, in connection with the Pennsylvania Co., have received in payment of the amounts due them, with interest thereon, $2,700,000 of 6 per cent. bonds, and $484,000 of 5 per cent. bonds, secured by mortgage; the former being subsequent in lien only to the outstanding first mortgage bonds. These bonds are believed to be a good security, and your company will in all probability be able to dispose of them, if it so desire, so as to be fully reimbursed for all the advances heretofore made to that road. The assets on hand Dec. 31, 1884, applicable to the redemption of the first-mortgage bonds, were $894,335.

"During the past year considerable expenditures were made in the construction of additional and improved shop facilities at Columbus, Indianapolis and Fort Wayne, and in providing at various points additional side tracks and terminal facilities.

"During the year there were laid on the northwestern lines operated directly in your interest 9,442 tons, and on the southwestern lines 11,209 tons, of steel rails.

"The amount expended during the year on capital account on the lines west of Pittsburg was $1,032,966.76.

"The aggregate amount of steel rails laid in 1884 on all lines owned, controlled or operated by your company east and west of Pittsburg was 66,602 tons."

### SUMMARY OF ALL LINES.

The following summary of all lines both east and west of Pittsburgh is given:

| | 1884. | 1883. | Decrease. |
|---|---|---|---|
| Gross earn. from traffic | $97,849,875 | $105,653,532 | $7,803,657 |
| Gross expenses, excluding rentals, interest, dividends, etc | 64,434,317 | $68,917,056 | 4,482,738 |
| Showing net earnings | $33,415,558 | $36,736,476 | $3,320,918 |

The summary of the traffic of all lines for the year is as follows:

| | 1884. | | 1883. | |
|---|---|---|---|---|
| *Passenger:* | Passengers. | Passenger-miles. | Passengers. | Passenger-miles. |
| East of Pittsburgh | 40,133,107 | 814,827,710 | 36,584,435 | 789,134,935 |
| West of Pittsburgh | 12,189,992 | 342,588,887 | 12,262,376 | 366,774,204 |
| Totals | 52,323,099 | 1,157,416,597 | 48,846,811 | 1,155,909,139 |
| *Freight:* | Tons. | Ton-miles. | Tons. | Ton-miles. |
| East of Pittsburgh & Erie | 56,523,890 | 5,114,912,189 | 57,379,115 | 5,066,083,175 |
| West of Pittsburgh | 25,061,208 | 2,576,669,303 | 26,319,047 | 2,693,140,873 |
| Totals | 81,585,098 | 7,691,581,492 | 83,698,162 | 7,759,224,048 |

The totals show an increase of 0.13 per cent. in passenger-miles and a decrease of 0.87 per cent. in ton-miles; coming wholly from the western lines.

### GENERAL REMARKS.

"Under the provisions of the trust created Oct. 9, 1878, there has been paid to Dec. 31, 1884, the sum of $3,700,000, which, with the income therefrom, has been invested in securities amounting at par to $4,423,750, yielding an interest of 6.806 per cent. per annum upon the investment.

"The subject of the continued appropriation of $600,000 per annum, as provided in the trust created Oct. 9, 1878, has had the careful consideration of your board. It will be seen that the par value of the securities in the trust is nearly $4,424,000, and the income therefrom exceeds $300,000 per annum. The principal object had in view at the time of the creation of this trust, namely, an improvement in the market value of all securities, the principal, interest or dividend upon which was guaranteed by the Pennsylvania Railroad Co., has been attained. Your board are of the opinion that the income of the fund as it now stands should continue to be added to the principal, and the monthly appropriation of $50,000 be reduced to an amount equal to 1 per cent. of the net income of the company before payment of dividend to the shareholders. On the basis of the net income for the past year the appropriation to the fund would have been about $86,000 instead of $600,000. If this suggestion is favorably received by the shareholders, your management would recommend that the incoming board be instructed to give at least 90 days' notice of the taking of a stock vote on the approval or disapproval of this proposed modification of the trust.

"The statement of the insurance fund shows the assets on hand at the end of the year $1,149,090, being an increase over the previous year of $3,683, notwithstanding the severe losses during the past year, notably that caused by the burning of the Jersey City depot, to the rebuilding of which this fund contributed $190,000.

"Your board have referred in previous reports to the annual loss sustained by your company in their efforts to maintain the American Steamship Co.'s line of steamers to and from the port of Philadelphia. They therefore deemed it wise to avail themselves of the opportunity of disposing of these vessels upon satisfactory terms to the International Navigation Co., especially as they secured thereby a more efficient weekly service between Philadelphia and Liverpool and between New York and Liverpool, both of which are to be operated in harmony with our systems of roads. It is believed that this arrangement will not only be productive of beneficial results to your company, but will also tend to advance the commercial interests of Philadelphia.

"The litigation connected with the agreement with the Central Railroad Co. of New Jersey for the joint use of the New York & Long Branch Railroad, referred to in the last annual report, remains in the same condition as at the close of 1883. Your company, however, under the injunction granted by the court, continue to use the road under the original contract.

"The Pittsburgh, Fort Wayne & Chicago Railway Co. having declined to issue, in settlement of expenditures made for the improvement and betterment of its property, and under authority of its board, the form of security heretofore agreed upon, and repeated negotiations having failed to effect a settlement of the matters of difference, your company applied to the courts for a judicial determination thereof, and finally secured a decision sustaining the position taken by your management. The officers of the Pittsburgh, Fort Wayne & Chicago Railway Co. have, in accordance therewith, issued a portion of the securities due your company for such improvements, and taken the necessary steps toward a settlement of the balance of your account.

"Notwithstanding the marked depression that has characterized the past year as one of the most unremunerative in the history of railways, your management considered it wise to continue the policy of strengthening your properties by further improving and extending the lines already in operation, and by promoting new branches for the development of the territory that is naturally tributary to your general system. In no case, however, has any responsibility been assumed except where it was believed that the direct result would be increased traffic, or where it was necessary to prevent the diversion of traffic heretofore enjoyed by your roads.

"The statement to be found on a previous page of this report will show the amounts that have been expended upon your Main Line and branches during the past year, the greater portion of which was for additional equipment and real estate. The amount expended upon the United Railroads of New Jersey was materially less than in 1883. No large expenditures will be required upon either of these properties during the current year, unless there is a material increase of traffic, or some outlay not now anticipated becomes necessary.

"Of the expenditures for improvements and additions to branch and auxiliary lines the principal items were: The extension of the fourth-track system upon the Connecting Railway, the link which connects your Main Line with the New Jersey system; the extension of branch lines upon the Tyrone & Clearfield Railway, for the purpose of further developing this important bituminous coal region, the results of which are shown in the general increase of tonnage therefrom; the extension of the Lewisburg & Tyrone railroad, a distance of 15 miles, to a junction with the Bellefonte, Nittany & Lemont Railroad, now being constructed by the Bald Eagle Valley Railroad Co. from Bellefonte, and thus securing a direct connection between these two systems; and the construction of a branch of the North & West Branch Railway to a new colliery, and additional tracks and facilities needed for its traffic. The latter line, which is comparatively new, furnishes an all-rail route for your Susquehanna coal, and has proved more productive than was anticipated.

"The amounts expended upon the Southwest Pennsylvania and the Pittsburgh, Virginia & Charleston railways were for the purpose of acquiring additional real estate and facilities for increased traffic. Both of these properties, in addition to bringing to your lines a large amount of business, were able to meet the interest upon their fixed liabilities, and the former company paid a dividend to its shareholders.

"The large investments heretofore made in improving the grades of the Western Pennsylvania Railroad have enabled it to be used during the past year as a low-grade line from Pittsburgh to the western slope of the Allegheny Mountains. As a direct result thereof the net earnings of this property were more than sufficient to provide for the interest upon its funded liabilities.

"The Susquehanna & Clearfield, and the Ridgway & Clearfield railroads, both branch lines extending into the bituminous coal lands tributary to your Philadelphia & Erie system, are now in active operation and securing additional tonnage for that road.

"The Philadelphia, Germantown & Chestnut Hill Railroad was opened for traffic in June, 1884. The number of passengers carried has been in excess of what was anticipated, and though the road may not for a few years be directly profitable, yet as a feeder to your main lines it fully meets the expectations of your management.

"The Pennsylvania Schuylkill Valley Railroad was completed as far north as Reading late in the fall, and is securing to your lines a share of the traffic of the country naturally tributary thereto. It is proposed during the coming season to make further progress in extending this road through the anthracite coal districts, looking ultimately to a connection with a branch of the Northern Central Railway at Shamokin, and with the North & West Branch Railway near your Susquehanna Coal Co.'s properties. Upon completion of these lines your system of roads will be enabled to share in the transportation from the west to these districts of the agricultural and other products upon which they are so largely dependent, and to secure in return a share of the east and westbound anthracite tonnage.

"No material investments will be required in new work during the current year beyond what has been referred to, except in short branches to promote the development of local interests.

"The contract with the Pullman Palace Car Co., which was made for a period of 15 years, expired by limitation on Jan. 27, 1885. It was thought advisable, in view of the contract relations of that company with the systems of railways connecting with your lines, and of the efficient manner in which it provides for the wants of the public, to enter into a new agreement, rather than assume the direct management of the sleeping cars upon your road, especially as the contract is not only favorable to your company, but will afford an opportunity, if it so desire, to share in the ownership and revenue of that equipment, and also to terminate it at certain stated periods if deemed to your best interest.

"The condition of the general transportation interests of the country fully confirms the correctness of the views expressed in the last report in reference to the maintenance of the present pooling system, and while your management have taken no active steps toward a direct withdrawal therefrom, yet they share the opinion with other large transportation interests of the country that its further maintenance under existing arrangements can hardly be productive of good, either to the public or to the railway interests.

"The marked decrease in the gross revenues of your properties, referred to in a previous portion of this report, was not due to any material diminution in the volume of traffic but to a serious reduction in the rates, forced upon your management by undue competition of other lines, and which in many instances were so low as to make it questionable whether any profit was earned thereon. This was felt more directly by your Western lines than by those east of Pittsburgh and Erie, the revenues of the former being more largely dependent upon through traffic. Further material reductions in rates cannot be made without seriously injuring the railway interests of the country, as they are now below what is fairly remunerative to even the most thoroughly equipped and efficient transportation routes.

"In view of the decrease in net earnings, your board felt it necessary to make a reduction in the rate of dividend, which, however, is still materially above the average interest received on first-class investments. Your management is convinced that the only way to keep your lines in a prosperous condition is to make prudent but liberal expenditures for their maintenance and improvement, and keep the financial credit of your company up to the highest standard."

## New York, Chicago & St. Louis.

This road extends from Buffalo, N. Y., to Grand Crossing, Ill., near Chicago, 514.54 miles. It is controlled by the Lake Shore & Michigan Southern Co. The following statements have been published for the year ending Dec. 31.

The stock is $22,000,000 preferred and $28,000,000 common. There are $15,000,000 first 6s, $703,000 second 6s, and $4,000,000 equipment 7s. On Dec. 31 the floating debt was $4,231,887; cash and cash assets, $1,993,954; balance of floating debt, $2,237,933. The debt includes interest accrued but not due.

The earnings for the year were:

| | 1884. | 1883. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Earnings | $3,207,590 | $2,327,083 | I. $879,907 | 37.8 |
| Expenses | 2,245,567 | 1,689,294 | I. 556,273 | 32.9 |
| Net earnings | $962,023 | $638,389 | I. $323,634 | 50.7 |
| Gross earn. per mile | 6,234 | 4,524 | I. 1,710 | 37.8 |
| Net " " | 1,870 | 1,241 | I. 629 | 50.7 |
| Per cent. of exps | 70.0 | 72.6 | D. 2.6 | .... |

The income account for the year was as follows:

| | |
|---|---|
| Net earnings as above | $962,023 |
| Other income | 14,592 |
| Total | $976,615 |
| Interest, rentals, etc | 1,495,583 |
| Deficit for the year | $518,968 |

The total deficit up to Dec. 31, was $1,302,456 for the period the road has been in operation, a little over two years.

## Northeastern (South Carolina).

This company owns a line from Charleston, S. C., to Florence, 102 miles. Its report is for the year ending Sept. 30.

It also owns one-half interest in the Central, of South Carolina, from Sumter to Lanes, 40 miles, the Wilmington, Columbia & Augusta owning the other half. The earnings of this Central road are not included below.

The equipment consists of 22 locomotives; 21 passenger train cars; 316 freight and 19 gravel cars. More cars are much needed.

The general account is as follows, condensed:

| | | |
|---|---|---|
| Stock | | $899,350 |
| Funded debt | | 1,836,000 |
| Accounts and balances | | 28,047 |
| Profit and loss | | 8,922 |
| Total | | $2,782,319 |
| Road and equipment | $2,494,700 | |
| Stocks owned | 118,148 | |
| Co.'s bonds on hand | 17,000 | |
| Accounts and balances | 137,458 | |
| Cash | 15,013 | |
| | | $2,782,319 |

The funded debt consist of $1,142,000 first 8s and $694,000 consolidated 6s. The consolidated mortgage is for $1,836,000, a sufficient amount being reserved to retire the firsts.

The chief items of traffic were:

| | 1883-84. | 1882-83. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Passengers, through | 41,936 | 35,067 | I. 6,869 | 19.6 |
| " local | 69,087 | 63,980 | I. 5,107 | 8.0 |
| Total | 111,023 | 99,047 | I. 11,976 | 12.1 |
| Bales cotton carried | 105,695 | 135,825 | D. 30,130 | 22.1 |
| Bbls. naval stores | 130,470 | 149,002 | D. 18,532 | 12.4 |

There was also a decrease in general freights. The decrease in cotton was due to a lighter crop.

The earnings for the year were:

| | 1883-84. | 1882-83. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Earnings | $569,471 | $618,747 | D. $49,276 | 7.9 |
| Expenses | 404,524 | 433,923 | D. 29,399 | 6.8 |
| Net earnings | $164,947 | $184,824 | D. $19,877 | 10 7 |
| Gross earn. per mile | 5,583 | 6,066 | D. 483 | 7.9 |
| Net " " " | 1,617 | 1,812 | D. 195 | 10.7 |
| Per cent. of exps | 71.0 | 70.1 | I. 0.9 | .... |

The earnings were diminished by the reduction in rates made by order of the Railroad Commission, while expenses were increased by additional train service, the running of fast trains and large renewals.

The expenses include the cost of 1,100 tons of steel rails laid in place of old iron and three new iron bridges built to replace wooden ones. The road-bed and track were much improved in condition. The terminal improvements at Charleston were continued, and a new warehouse built, with a wharf and sidings, costing in all $54,912.

Besides interest payments, dividends amounting to 6 per cent. were paid on the stock during the year.

## Boston, Hoosac Tunnel & Western.

This company owns a line from Rotterdam Junction, N. Y., to the Massachusetts line, 61 miles. It controls and leases branches to Saratoga, 18, and to Schuylerville, 8 miles, making 87 miles worked. Its trains use the Troy & Greenfield road from the state line to North Adams, Mass., 7 miles, paying tolls to the state of Massachusetts on all business done over that line. The following statements have been published for the year ending Sept. 30 last.

The stock and debt are given as follows:

| | |
|---|---|
| Stock | $3,551,000 |
| Bonds, debentures 5s | 2,000,000 |
| Unfunded debt | 1,187,674 |
| Total | $6,738,674 |

The unfunded debt increased $156,218 during the year.

The earnings for the year were as follows:

| | 1883-84. | 1882-83. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Earnings | $464,970 | $368,235 | I. $96,735 | 26.3 |
| Expenses | 439,139 | 388,923 | I. 50,216 | 12.9 |
| Net or deficit | N. $25,831 | D. $20,688 | I. $46,519 | .... |
| Gross earn. per mile | 5,344 | 4,233 | I. 1,111 | 26.3 |
| Net " " | 297 | ..... | ..... | .... |
| Per cent. of exps | 94.4 | 105.6 | D. 11.2 | .... |

Interest on the bonds is $100,000, and upon the floating debt about $60,000, a total of $160,000, leaving a deficit of $184,169 for the year. The leased lines receive only their net earnings as rental.

RAILROAD GAZETTE

Published Every Friday.

## EDITORIAL ANNOUNCEMENTS.

**Passes.**—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

**Contributions.**—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

**Advertisements.**—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

## THE PENNSYLVANIA RAILROAD REPORT.

The report of the board of directors of the Pennsylvania Railroad Company, to be submitted to the stockholders' meeting next week, is this year so much abridged as to make impossible some of the most interesting comparisons with the results attained in previous years. This report of the board, made in time for the stockholders' meeting, within two months of the end of the year, has always been comparatively meagre, though generally very long; for the company's operations extend over so many different railroads that a very little information concerning each covers a great deal of space. Two or three months later a very full and detailed report is given, very valuable to students of railroad operation, but it attracts very little attention from the public.

The directors' report heretofore, however, has given the earnings from each source on each of the three great divisions east of Pittsburgh and Erie, while this year it gives only the total earnings. The details of working expenses, which are absolutely indispensable to a judgment on their adequacy and the true financial condition of the company, are not given now, and were not last year, in the directors' report; and so far as earnings and expenses are concerned, the report adds to the information given in the monthly reports only the amounts by each of the three great divisions and the amounts on the system west of Pittsburgh and Erie, of which latter the monthly reports show only how much the net earnings exceed or fail to cover their liabilities.

We give first the enormous figures of the aggregate earnings and expenses of the whole great system of railroads east and west of Pittsburgh owned or *controlled* by the Pennsylvania Railroad Company, as follows:

| | 1884. | 1883. | 1882. |
|---|---|---|---|
| Gross earnings | $97,849,875 | $105,653,532 | $101,514,926 |
| Expenses | 64,434,317 | 68,917,056 | 65,385,714 |
| Net earnings | $33,415,558 | $36,736,476 | $36,129,212 |

Compared with 1883 the decreases in 1884 were:

| | Gross earnings. | Expenses. | Net earnings. |
|---|---|---|---|
| Amount | $7,803,657 | $4,482,739 | $3,320,918 |
| Per cent | 7·4 | 6·5 | 9 0 |

The earnings of this Pennsylvania system in 1883 were 13 per cent. of the earnings of all the railroads in the United States, which suffices to give an adequate idea of its great importance, and of the significance of the changes which occur on it. The decrease in gross earnings was so large that in spite of a decrease of 6½ per cent. in the working expenses, the net earnings fell off 9 per cent. As these lines form a very large proportion of the railroad on which trunk-line rates prevail east of New England, which may be roughly described as the part of the country north of the Potomac and the Ohio and east of Chicago and St. Louis, this may be regarded as a very strong indication of the general course of earnings in this territory.

It is, however, surprising to find that the traffic on this system has been so well maintained. It has been:

| *Ton-miles:* | 1884. | 1883. | 1882. |
|---|---|---|---|
| East of Pittsburgh | 5,114,912,189 | 5,066,083,175 | 4,862,702,539 |
| West of Pittsburgh | 2,576,669,303 | 2,603,140,873 | 2,729,844,763 |
| Total | 7,691,581,492 | 7,779,224,048 | 7,592,547,302 |
| *Passenger-miles:* | | | |
| East of Pittsburgh | 814,827,710 | 789,134,935 | 748,484,865 |
| West of Pittsburgh | 342,588,887 | 366,774,204 | 369,349,969 |
| Total | 1,157,416,597 | 1,155,909,139 | 1,117,834,834 |

The total freight movement thus was but ¼ per cent. less last year than in 1883, and was 1½ per cent. more than in 1882, and the total passenger movement was a trifle greater last year than in 1883, and 3½ per cent. more than in 1882.

There has, however, been an appreciable decrease on the western system, whose freight traffic last year was nearly 6 per cent. less than in 1882, and 4½ per cent. less than in 1883, while its passenger traffic was 7¼ per cent. less than in 1882, and 6½ per cent. less than in 1883. The eastern system made a slight gain over 1883 in both traffics, and an increase of 5 per cent. in freight and 9 per cent. in passengers over 1882.

It is well to remember that it is the eastern system of this company which has best maintained its position and has had a growth of traffic in a time of great industrial depression; but it is also well to remember that this company's "western system" does not consist of what are generally considered "western" railroads, but of lines north of the Ohio, where railroad construction has been most overdone; where there is no longer a rapid growth of agriculture, and where probably manufacturing industries, which have been greatly extended, are less firmly established than further east. Here, too, the through freight forms a large proportion of the whole, and this has been much divided of late years by the opening of new lines. The railroads west of Chicago belong to a different category.

The financial result to the Pennsylvania Railroad Company of the operations of its system is indicated by the fact that while in 1883, after paying a dividend of 8½ per cent., there was a surplus of profits amounting to $1,418,545, in 1884, after paying a 7 per cent. dividend, the surplus was only $419,734—a very narrow margin for so very large a company. The income and its disposal for the two years was:

| | 1884. | 1883. |
|---|---|---|
| Net earnings Penna. R. R. Div | $12,621,778 | $13,696,400 |
| Income from investments, etc | 4,489,774 | 4,676,960 |
| Total income | $17,111,552 | $18,373,360 |
| Interest and other charges | 6,926,023 | 6,429,928 |
| Loss on New Jersey lease | 593,536 | 653,915 |
| Purchases of guaranteed securities | 600,000 | 600,000 |
| Sinking fund | 277,463 | 280,860 |
| Allegheny Valley deficit | 698,320 | 661,010 |
| Fred. & Pa. Line deficit | 15,000 | 15,000 |
| Am. Steamship Co., advances | | 180,000 |
| Old claims and charged off for depreciation | 1,020,692 | 603,452 |
| Total charges | $10,131,031 | $9,424,165 |
| Balance | $6,980,521 | $8,949,195 |
| Per $100 of stock | 7.45 | 10.10 |
| Dividends | 6,560,787 | 7,530,650 |
| Surplus | $419,734 | $1,418,545 |

Thus, while the income decreased $1,262,000, the charges increased $707,000, so that the balance, which forms the divisible stockholders' profits, decreased $1,969,000, or 22 per cent., and the profit *per share* decreased $2.65, or 26½ per cent. The latter is calculated on the average amount of stock.

Going into the details of the charges, we find there are several which are properly parts of the profits of the stockholders. Such certainly are the purchases of guaranteed securities, which now yield a yearly income of $300,000 a year, and the sinking fund payments. Nominally the advances to the Allegheny Valley and the Frederick & Pennsylvania Line are also, as these companies owe for these advances; but it is questionable whether they can ever pay, and therefore the asset may not be valuable. The very large sum charged off for "old claims and accounts and for depreciation"—over a million of dollars—is calculated to excite remark, as it is more than 1 per cent. on the capital stock.

The income from investments and for use of rolling stock last year was but little less than in 1883, and formed more than one fourth of the total income. The investments in the company's branch and auxiliary lines increased $1,535,800 during 1884, to $96,866,917. The income on these investments was $3,956,374, or 4.08 per cent. on their cost; but it was $156,685 less than the income from the smaller investment in 1883.

Below we follow the course of the earnings and expenses of each of the three great divisions of the system worked by the company directly:

| *Gross earn.:* | Pa. R. R. Div. | United of N. J. | Phila. & Erie. | Total. |
|---|---|---|---|---|
| 1884 | $30,196,885 | $14,709,887 | $3,660,146 | $48,566,918 |
| 1883 | 32,017,813 | 14,956,595 | 4,108,843 | 51,083,251 |
| Decrease | $1,820,928 | $246,708 | $448,697 | $2,516,333 |
| P. c. of dec | 5.7 | 1.6 | 10.9 | 4.9 |

Thus the rate of decrease was greatest on the Philadelphia & Erie, which has the largest proportion of through traffic, and was least and very small on the New Jersey lines.

Meanwhile the working expenses were:

| *Expenses:* | Pa R. R. Div. | United of N. J. | P. & E. | Total. |
|---|---|---|---|---|
| 1884 | $17,575,106 | $10,749,844 | $2,202,066 | $30,527,016 |
| 1883 | 18,321,413 | 10,804,913 | 2,620,823 | 31,747,149 |
| Decrease | $746,307 | $55,069 | $418,757 | $1,220,133 |
| P. c. of dec | 4.1 | 0.5 | 16.0 | 3.8 |

Thus the rate of decrease of expenses was also largest on the Philadelphia & Erie and was trifling on the New Jersey lines.

The net earnings were:

| *Net earn.:* | Pa. R. R. Div. | United of N. J. | P. & E. | Total. |
|---|---|---|---|---|
| 1884 | $12,621,779 | $3,960,043 | $1,458,080 | $18,039,902 |
| 1883 | 13,696,400 | 4,151,682 | 1,488,020 | 19,336,102 |
| Decrease | $1,074,621 | $191,639 | $29,940 | $1,296,200 |
| P. c. of dec | 7.8 | 4.6 | 2.0 | 6.7 |

The decrease in net earnings was thus much the greatest on the Pennsylvania Railroad Division, and was least and very small on the Philadelphia & Erie, where the very large decrease in gross earnings was nearly counterbalanced by the very large decrease in expenses.

The earnings and expenses of the vast system of leased and controlled lines west of Pittsburgh and Erie are given in three divisions. First are the roads leased by the "Pennsylvania Company," which include the Pittsburgh, Fort Wayne & Chicago, the Cleveland & Pittsburgh, the Erie & Pittsburgh, the Jeffersonville, Madison & Indianapolis, and shorter lines to Ashtabula, Toledo and Vincennes, about 1,358 miles in all. The earnings, expenses and charges of this system were:

| *Penna. Co.:* | 1884. | 1883. | 1882. | 1881. |
|---|---|---|---|---|
| Gross earn. | $16,472,283 | $19,147,348 | $19,025,661 | $19,788,671 |
| Expenses | 10,844,961 | 11,966,298 | 10,976,120 | 10,760,215 |
| Net earn | $5,627,322 | $7,181,050 | $8,049,541 | $9,028,456 |
| Rental, int., etc | 6,344,003 | 6,385,846 | 6,180,163 | 6,167,704 |
| Surplus | | $795,204 | $1,869,378 | $2,860,752 |
| Deficit | $714,631 | | | |

This is the most notable change in the earnings of this company's western system that has occurred for many years. The gross earnings of this system had been quite well maintained until last year, and then they fell off $2,675,000 (14 per cent.) at once. The net earnings had previously decreased largely, but last year the decrease from 1883 was $1,553,728 (21½ per cent.), and the decrease from 1881 was no less than $3,401,134 (37⅔ per cent.). More than half the earnings of the Pennsylvania Co.'s lines have heretofore been made by the Pittsburgh, Ft. Wayne & Chicago, which has always yielded a profit above the rental, which from 1877 to 1883 had varied from $200,000 to $1,700,000, aggregating for the seven years $6,994,000. The great decrease of the Pennsylvania Co.'s lines last year was doubtless chiefly on this road, which has lost traffic not only to the two new roads to Chicago (which are near it), but also to the other Pennsylvania road to Chicago, the Chicago, St. Louis & Pittsburgh, which is now getting a share of the live stock, almost entirely at the expense of the Fort Wayne. It is not the new roads alone, however, that have hurt the Fort Wayne's traffic. Other roads now compete more effectively for the large coke traffic to the West, and probably for all Pittsburgh traffic. But there are other roads in the Pennsylvania Company which probably suffered last year, as the Cleveland & Pittsburgh and the Erie & Pittsburgh, whose traffic depends largely on the activity of the iron business, and their rates more than their traffic on the prosperity of that business.

The earnings and expenses of the lines worked by the Pittsburgh, Cincinnati & St. Louis Co., which include the road of that name with an extension to Cincinnati, and numerous branches in Southern Ohio, amounting in all to 592 miles, were:

| *P. C. & St. L.* | 1884. | 1883. | 1882. |
|---|---|---|---|
| Gross earnings | $6,435,519 | $7,045,314 | $6,660,630 |
| Expenses | 4,716,549 | 5,141,265 | 4,694,649 |
| Net earnings | $1,718,970 | $1,904,049 | $1,965,981 |
| Rentals, interest, etc | 1,833,169 | 1,875,357 | 1,971,547 |
| Profit | | $28,692 | |
| Loss | $114,199 | | $5,566 |

The decrease in these roads is 9 per cent. in gross and 10 per cent. in net earnings since 1883, and but 3½ per cent. in gross, though 12½ per cent. in net, since 1882—very much less than the decrease on the lines of the Pennsylvania Co. This southern system has never returned any profit to speak of, though comparisons

with years previous to 1882 are difficult, because then what is now the Chicago, St. Louis & Pittsburgh was included, and there was a large loss on it.

There has been nothing like the increase of competition or the traffic carried by these roads as in that or the traffic further north on the Pennsylvania Co.'s lines, and what the Chicago, St. Louis & Pittsburgh has taken from the Fort Wayne has gone to the Pittsburgh, Cincinnati & St. Louis.

The earnings and expenses of the allied companies which work their own roads, including the Chicago, St. Louis & Pittsburgh, the Grand Rapids & Indiana, the Vandalia Line and the East St. Louis & Carondelet (1,260 miles), have been:

| | 1884. | 1883. | 1882. |
|---|---|---|---|
| Gross earnings | $8,481,896 | $9,934,563 | $9,644,712 |
| Expenses | 6,565,307 | 7,864,995 | 7,697,559 |
| Net earnings | $1,916,589 | $2,069,668 | $1,947.153 |
| Rental and interest | 2,086,805 | 2,187,834 | 1,909,965 |
| Profit | ..... | ..... | $37,188 |
| Loss | $170,216 | $118,167 | ..... |
| Pa. R. R. Co.'s share | 33,011 | 11,227 | 30,488 |

Thus the decrease in the gross earnings of these roads since 1883 has been 14½ per cent., but there was a heroic reduction in expenses, amounting to $1,300,000, or 16½ per cent., and the decrease in net earnings was small, and the increase in the deficit trifling. More than half the earnings of these lines in 1883 were by the Chicago, St. Louis & Pittsburgh, and nearly one-fifth of them by the Vandalia Line, both of which suffer greatly by demoralized through rates.

We see, then, that the western connections of the Pennsylvania Railroad last year shared in the decline in earnings and profits which has been shown by other western connections of the trunk lines, and notably by the Lake Shore, whose gross earnings were $3,611,000 (19½ per cent.) and net earnings $1,841,000 (17 per cent.) less last year than in 1883; and by the Michigan Central, which reported a decrease of 16 per cent. in gross and 36 per cent. in net.

We have seen above that the decrease in traffic last year was not large, even on the western lines of the Pennsylvania, while there was an increase on the eastern system. Therefore the decrease in earnings was due to lower rates. The rates are given in the report only for the lines east of Pittsburgh and Erie. On the whole of these the average rate, expense and profit have been for nine years, in cents:

| | Ton-mile. | | | Passenger-mile. | | |
|---|---|---|---|---|---|---|
| | Rec't. | Cost. | Profit. | Rec't. | Cost. | Profit. |
| 1876 | 0 915 | 0.660 | 0.255 | 2.056 | 1.055 | 1.001 |
| 1877 | 1.013 | 0.615 | 0.398 | 2.323 | 1.734 | 0.530 |
| 1878 | 0.939 | 0.545 | 0.394 | 2.309 | 1.712 | 0.597 |
| 1879 | 0.824 | 0.480 | 0.344 | 2.255 | 1.709 | 0.546 |
| 1880 | 0.918 | 0.540 | 0.378 | 2.222 | 1.674 | 0.548 |
| 1881 | 0.857 | 0.517 | 0.340 | 2.276 | 1.615 | 0.661 |
| 1882 | 0.874 | 0.554 | 0.320 | 2.249 | 1.663 | 0.586 |
| 1883 | 0.881 | 0.562 | 0.319 | 2.297 | 1.626 | 0.671 |
| 1884 | 0.804 | 0.518 | 0.286 | 2.258 | 1.621 | 0.637 |

Thus the average freight rate was lower last year than ever before and 9 per cent. less than in 1883, when, however, the rate was higher than it had been in most recent years. The average cost was 8 per cent. less than in 1883, but it was a trifle greater than in 1881 and 8 per cent. greater than in 1879. The profit was less than in any other year except 1876, which was a year of railroad war. It is to be noticed that the cost as well as the average rate tended to increase until last year. In 1883 the cost was greater than in any previous year since 1877.

The average passenger rate and cost did not differ greatly from those of other recent years.

These are the figures for all the lines east of Pittsburgh and Erie, which for freight are greatly increased by the high rate and cost on the New Jersey lines. The receipt, cost and profit per ton per mile on each division for six years have been, in cents:

| | 1879. | 1880. | 1881. | 1882 | 1883. | 1884. |
|---|---|---|---|---|---|---|
| *N. J. Lines:* | | | | | | |
| Receipt | 1.473 | 1.672 | 1.487 | 1.447 | 1.471 | 1.365 |
| Cost | 1.012 | 1.204 | 1.064 | 1.126 | 1.167 | 1.081 |
| Profit | 0.461 | 0 468 | 0.423 | 0.321 | 0.304 | 0.284 |
| *Pa. R. R. Div:* | | | | | | |
| Receipt | 0.796 | 0.880 | 0.799 | 0.817 | 0.819 | 0.740 |
| Cost | 0.427 | 0.474 | 0.437 | 0.473 | 0.477 | 0.441 |
| Profit | 0.369 | 0.406 | 0.362 | 0.344 | 0.342 | 0.299 |
| *P. & E:* | | | | | | |
| Receipt | 0.512 | 0.560 | 0.554 | 0.615 | 0.624 | 0.576 |
| Cost | 0.354 | 0.358 | 0.415 | 0 430 | 0.416 | 0.365 |
| Profit | 0.158 | 0.202 | 0 139 | 0.185 | 0.208 | 0.211 |

The receipt and cost were less in 1879 than they had ever been before, and on the Pennsylvania Railroad Division and the Philadelphia & Erie the receipt was less than ever after until last year, and on all the lines the cost was less in 1879 than in any year since, including last year, when, however, the minimum figures of 1879 were closely approached.

These facts deserve attention, because the general opinion is that the average rate and cost, which declined rapidly from 1872 (and before) to 1879, continued to decrease afterward. This, however, was not the case. The rise in wages and prices caused an increase in cost, in spite of the increase in traffic, and this railroad, and in most years the other trunk lines also, were able to get higher rates also, though except in 1880 the *profit* per ton per mile was generally less than in 1879. By the falling off of that profit in 1884 on its lines east of Pittsburgh the Pennsylvania Railroad Company lost about $1,400,000, but not one eighth as much by the decrease in the passenger profit.

## Rates and Cost of Transportation in France.

Mr. Charles Baum, a French engineer who has published several studies of the cost of transportation, after an examination of the course of the cost on the French railroads, finds what he calls a "notable reduction" in the cost from 1879 to 1881. This "notable reduction," however, on the system where it was greatest, namely, the "old system" of the Eastern Company, was, for *interest* as well as working expenses, from 1.25 to 1.07 cents per ton per mile; and even as far back as 1872 the cost on this road was but 1.263 cents per ton per mile, so that in nine years the decrease was 0.193 cent, or 15⅓ per cent.—not as much as has been made in a single year on some of our railroads. The *working* expenses per ton per mile on this railroad were greater in 1879 than in 1872, and the decrease from 1872 to 1881 was from 0.80 to 0.736 cent, or 8 per cent. The lowest working expense in 1881 was 0.620 cent, on the old system of the Orleans Company, which had been 0.697 cent in 1872 and precisely the same in 1879. The decrease in interest has been much greater than in working expenses per ton per mile, made so, doubtless, by the increase in traffic, but even this decrease has been small. Interest is reckoned on the whole capital, and is not the profit received.

The averages shown are greatly reduced because nearly all the lines of light traffic of each company are included in what is called the "new system," on which the cost is generally very much greater than on the "old system." The highest cost for working in 1881 was 1.386 cents per ton per mile, on the "new system" of the Western Company, while on its "old system" the cost was but 0.753 cent. The lowest cost that year on a "new system" was 0.854 cent, on the Orleans, against 0.620 on its old system. The cost for interest per ton per mile was naturally immensely greater on the "new system," as follows, in cents, in 1881:

| *System:* | North-ern. | East-ern. | West-ern. | Or-leans. | P. L. & M. | South-ern. |
|---|---|---|---|---|---|---|
| Old | 0.460 | 0.333 | 0.532 | 0.400 | 0.674 | 0.512 |
| New | 0.949 | 0.956 | 1.327 | 1.296 | 2.082 | 1.400 |

The state railroads, all of which are classed with the new system, cost 1.32 cents per ton per mile for working, and 1.204 cents for interest in 1881, a reduction from 1.331 for working and 1.366 for interest in 1879.

On the average, the working expenses per ton per mile on the old system fell from 0.700 to 0.672 cent from 1879 to 1881. Of the decrease, 30 per cent. was in car and motive-power expenses, which were reduced 2½ per cent., and 70 per cent. in maintenance-of-way expenses, which were reduced 13 per cent.

On the new system, the working cost had fallen from 1.170 to 1.089 cents per ton per mile, or 7 per cent., and there was a decrease of 18 per cent. in "administration" (or general) expenses, 8 per cent. in maintenance of way and also in motive-power and car expenses -all what would be thought inconsiderable changes here.

The average rates actually received per passenger and per ton per mile have been, in cents, *on both systems:*

| | 1872. | 1873. | 1874. | 1879. | 1880. | 1881. |
|---|---|---|---|---|---|---|
| Pass.-mile | 1.646 | 1.649 | 1.652 | 1.606 | 1.566 | 1.550 |
| Ton-mile | 1.621 | 1.618 | 1.632 | 1.658 | 1.652 | 1.630 |

The changes seem astonishingly small in this country; from 1872 to 1881, a decrease of 6 per cent. in the passenger fare, and an *increase* of ½ per cent. in the freight rate. The rates may be compared with those shown by our Census for the year 1880 or thereabout. These were 1.29 cents per ton per mile, and 2.33 cents per passenger-mile. At the French rates of 1881 (the lowest) the earnings of the American railroads from their traffic in the Census year would have been:

| | | | |
|---|---|---|---|
| From passengers | $95,933,234 | instead of | $144,101,709 actual. |
| From freight | 527,286,200 | " " | 416,145,758 " |
| From both | $623,219,434 | " " | $560,247,467 " |

The decrease by the lower passenger rate would have been $48,168,475, and the increase by the higher freight rate would have been $111,140,442, leaving a net gain of $62,971,967 by the application of the French rates, which is but $7,580,000 less than the amount of dividends paid by our companies in the Census year.

Although the cost of transportation was something like twice as great on the new system as on the old in France, the average rates collected were very little more for freight and considerably less for passengers on the new system. They were on the average:

| | Pass.-mile. | | Ton-mile. | |
|---|---|---|---|---|
| | Old system. | New system. | Old system. | New system. |
| 1872 | 1.686 | 1.513 | 1.621 | 1.632 |
| 1873 | 1.686 | 1.531 | 1.616 | 1.630 |
| 1874 | 1.693 | 1.528 | 1.627 | 1.658 |
| 1879 | 1.643 | 1.513 | 1.632 | 1.730 |
| 1880 | 1.603 | 1.469 | 1.630 | 1.722 |
| 1881 | 1.587 | 1.454 | 1.613 | 1.691 |

In 1881 the lowest average passenger rate on the old system of any company was 1.492 cents per mile, on the Eastern, and the highest 1.671 cents, on the Paris, Lyons & Mediterranean; the lowest freight rate was 1.338 cents per ton per mile, on the Eastern, and the highest was 2.038 cents, on the Southern. The lowest passenger rate of all was 1.194 cents, on the state system, but on all but one of the company railroads the average fare was less on the new than the old system. The freight rate on the state system was 1.529 cents, having been reduced from 2.024 cents in 1879. The lowest freight rate on the new system of a company was 1.571 cents (Orleans); the highest, 2.055 cents (Southern).

We have to go back as far as 1855 to find the French rates greatly higher than they are now. They were, in cents per ton per mile, in 1855 and 1881:

| | North-ern. | East-ern. | West-ern. | Or-leans. | P., L. & M. | South-ern. |
|---|---|---|---|---|---|---|
| 1855 | 1.828 | 1.949 | 2.534 | 2.184 | 2.363 | 2.254 |
| 1881 | 1.509 | 1.338 | 1.728 | 1.705 | 1.551 | 2.038 |
| Decrease | 0.319 | 0.611 | 0.806 | 0.479 | 0.812 | 0.216 |
| P. c. | 17½ | 31½ | 32 | 26½ | 34½ | 9½ |

The comparison is unduly favorable for 1881, as the rates that year are those of the old system only, which are somewhat lower than for the whole system, though not very much.

Compare these rates with those of some American railroads in 1873 and 1881:

| | Boston & Albany. | N. Y. Cen. | Erie. | Penna. | Lake Shore. | C., B. & Q. | C. & N. W. |
|---|---|---|---|---|---|---|---|
| 1873 | 1.96 | 1.573 | 1.455 | 1.416 | 1.437 | 1.920 | 2.350 |
| 1881 | 0.96 | 0.783 | 0.805 | 0.799 | 0.651 | 1.258 | 1.470 |
| Dec | 1.00 | 0.790 | 0.650 | 0.617 | 0.786 | 0.662 | 0.880 |
| P. c. | 51 | 50 | 45 | 44 | 55 | 34½ | 37½ |

Rates as far back as 1855 cannot be ascertained or many American railroads. On the Pennsylvania Railroad in that year the receipt was 2.746 cents per ton per mile, or more than the highest French rate then. But the Pennsylvania rate decreased 1.947 cents (71 per cent.) from 1855 to 1881, while the greatest decrease on a French railroad was 0.812 cent (34½ per cent.).

All of the American railroads had a larger decrease in their average freight rate from 1873 to 1881 than four of the six French companies had from 1855 to 1881.

The French railroads have a larger territory and population to draw traffic from than most of our railroads east of the Mississippi, and they can hardly be said to interfere with each other at all, the system having been designed by the government almost from the first as a "regulated monopoly," each company having a territory to itself. It may be claimed, on the one hand, that the legal monopoly has prevented any great reduction of rates, such as there has been here, but it is probable that the "regulation" has had much more to do with it than the "monopoly;" for self-interest would almost certainly have led the companies to make many very low rates in order to develop traffic not otherwise to be obtained, if they had been perfectly free. Differences in rates for many causes have been permitted, but not such great ones as we have had here, and as are often indispensable for the creation of new traffic. Of course no such growth as there has been here would have been possible in France, because there was not there a vast area of uncultivated land; but it is hard to believe that a rational policy with regard to rates would not have caused a much greater development of traffic there than there actually has been, or that with such a system of rates and a traffic so developed the average charge and expense per ton per mile need be more there than here, especially when we remember that there are 2,000 inhabitants per mile of railroad there, and but 458 here.

As the result of his study, Mr. Baum concludes that (including interest in the expenses) the passenger rates do not cover the expenses in France, taking the system altogether, while there is a profit on the freight. There is a profit on both traffics on the old system, and a loss on both on the new; and it is doubtless true that the practice of making rates substantially as low on a road with a very light traffic as on one with the heaviest traffic produces this effect. The same is true here, where branches of a great railroad frequently do not pay expenses, but substantially have them paid by the traffic on other parts of the system; but we are not often able to discover this because earnings and expenses of different lines of a system are not often reported separately.

An annoyance which the traveller on express trains meets with in Massachusetts, as in some other states also, is the bringing the train to a full stop before passing over the grade crossing of another road, even if there is no train there. This stop is required by a law passed thirty years ago, in 1855, and from the political character of that Legislature is commonly known as the "Know-nothing" stop or station. It is a curious fact that this law was the sole result of a special commission appointed to consider and report

some means of obviating the several grade crossings of railroads on the northerly side of Boston; and it has probably done more than anything else to perpetuate those crossings. There can be no doubt that at the time it was passed the rule was a salutary measure, as a general rule, and promoted the safety of travelers, without causing to any considerable extent a sense of inconvenience. But since that time the multiplication of such crossings by the construction of new roads, the great increase in the number of express trains, and the changed traveling habits of the people, who now demand fast trains with the fewest possible stops, contribute to make the "know-nothing stop" a nuisance, especially to one who is on a long journey. Meanwhile, systems of interlocking switches and signals were in use at such crossings in other countries, and had been improved and perfected so as to secure much greater safety to trains than the old system of signals only, operated by a man (and sometimes by a boy), by whose mistake or carelessness serious accidents have occurred.

The necessity of adopting some better system than the antiquated "know-nothing" stop was recognized by the Legislature of Massachusetts, and in 1881 a law was passed which authorized two railroad companies whose roads cross at the same grade to establish a system of interlocking or automatic signals to govern the movement of trains, and when the signals are approved by the Railroad Commissioners, the roads may discontinue the know-nothing stop. Such a system of interlocking signals and switches has been established and put in complete operation at the crossings of the Old Colony and New York & New England roads in Walpole, the Boston & Albany and Old Colony in South Framingham, and the Fitchburg and Old Colony in Fitchburg, and the same roads in Concord, and we are informed that other roads contemplate the adoption of the system.

Where the intersecting roads are prosperous and have a large passenger traffic, with frequent express trains, the relief from the know-nothing stop and the increased security ought to be a sufficient inducement to intelligent managers to adopt such an improvement. But where an important line is crossed by a road of small traffic and limited means, it can hardly be expected that the poorer road will be willing to share the expense of such a system, while in proportion to the small traffic of the inferior road the annoyance to passengers on the main line is increased.

To meet such cases as this, a bill is now before the Legislature of Massachusetts which provides that a road desiring to establish a system of interlocking signals at the intersection of another road, which refuses to join in the work, may do so at its own expense, and for the maintenance of the system the other road shall contribute the amount of its share of the expense of the old system. To this, it would seem, there could be no reasonable objection on the part of the smaller road. The bill also provides for the other road becoming a part owner of the system upon the payment of such proportion of the cost as may be awarded by the Railroad Commissioners.

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It is noticeable that the chief decrease in the December earnings of the Chicago, Burlington & Quincy Railroad was in passenger earnings, which fell off no less than 17¼ per cent., though earlier in the year there had generally been an increase in these earnings, and so great that for the whole year there was an increase of 1 per cent. in them. This may indicate that the people were beginning to feel poor, for, of course, there has been no decrease in population, and there has been no new competition of importance.

Taking the whole year together, the passenger earnings, as we have said, increased slightly over 1883, but the freight earnings fell off nearly a million dollars, while the mail, express and other earnings increased 24¼ per cent. For five years the earnings from the several sources have been:

| Year. | Passenger. | Freight. | Other. | Total. |
|---|---|---|---|---|
| 1880..... | $4,534,209 | $16,05-,197 | $903,641 | $20,490,047 |
| 1881..... | 3,616,086 | 16,595,819 | 1,112,245 | 21,324,150 |
| 1882..... | 4,756,992 | 15,711,510 | 1,534,802 | 22,003,304 |
| 1883.. ..... | 5,285,839 | 19,514,161 | 1,310,369 | 26 110,369 |
| 1884..... | 5,339,866 | 18,514,432 | 1,629,373 | 25,483,671 |

Relatively the passenger and miscellaneous earnings (which are chiefly earnings by passenger trains), have grown much faster than the freight earnings. Since 1880 there has been an increase of 15½ per cent. in freight earnings, 51 per cent. in passenger earnings, and 80 per cent. in other earnings. This is an extraordinary growth in passenger earnings, much greater than could be expected to follow the opening of the extension to Denver, and such additions as there have been to the mileage. In 1880 17¼ per cent. of the total earnings came from passengers; in 1884, 21 per cent. The proportion of freight earnings fell from 78.3 per cent. of the whole in 1880 and 74.7 per cent. in 1883 to 72.6 per cent. in 1884. Meanwhile the passenger earnings of the Chicago & Alton (without change of mileage) also increased very fast—34 per cent. from 1880 to 1884—while the freight earnings increased but 4½ per cent. The Chicago, Rock Island & Pacific gained 42 per cent. in passenger earnings from 1880 to 1884 (years ending with March), but only ¼ per cent. in freight. Thus it seems that generally among the Chicago railroads there has been a much greater development of passenger than of freight earnings during the past five years, and that the passenger earnings have been more stable than the freight earnings, usually not falling off at all, and at worst but little, unless it may be in recent months.

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## Railroad Surveys and Topography.

Our correspondents on this subject have shown a marked tendency to fall back upon the singular, yet in a sense natural, argument which seeks to defend some one way of doing things by showing that some of those who take another way do work badly. A letter in another column and one which appeared last week are merely the latest of many instances in which, on the one hand, we have pictured the "born engineer" spending days in fitting a bad line to the side of a hill with his "practical eye," when hours would have sufficed with the assistance of a little well-taken topography; and on the other hand, the spectacle of a man studying over topographical maps of a line in the wrong place, and so wedded to their use that he contentedly intrusts the field work to journeymen, missing the salient features and perpetuating on the ground errors of the maps.

Both these pictures may well be drawn from life, for out of a hundred men doing anything which requires skill, more than half will, in general, do it but indifferently well, a considerable fraction wretchedly ill, and only a small proportion thoroughly well. This fact insures a supply of ready weapons for supporting either side of any argument, yet it is strange that they should be so often chosen, since it is clear that they prove nothing. But as evidence of this inconclusive character seems sometimes to carry undue weight, we may add a few words to the discussion published Jan. 9 of "The Use and Abuse of Topography."

The fact that the actual profile of a line run from a "paper location" agrees so precisely with that called off from the map that the two cannot be told apart, is not a proof of the excellence of the system, for the advocates of the other view might reply that both profiles may be bad, and probably would be, made in that way. It proves the geometrical excellence of the work, but it also proves, or tends to, that the whole process is too mechanical; for it may be reasonably claimed that a "paper location," put in in a few hours, could and would be improved or modified in detail so as to be at least distinguishable from the other, during the days or weeks of putting the line upon the ground, if the latter were not improperly degraded into a purely mechanical process.

On the other hand, fixing the details of the alignment in the office, to be put on the ground by other men of less skill, is not necessarily a wrong way of doing things. We are often compelled to do, not what we would, but what we can. If there be but one skilled man to look after half a dozen parties, and, perhaps, look after other work as well, it is impossible that he should do much more than put the line on paper, and he is far more likely to project a good line in that way than an inexperienced man is to reach the same end, either on paper or on the ground, or both. When, however, one ceases to look on this practice as merely a necessary evil, and begins to look on it as an ideal state of things, as one of our correspondents seems to do, so that on a "difficult line" it was "required" that the projected location should be "strictly followed," and no cut and-try was permitted, then the abuse of topography—and a dangerous abuse sure to waste more or less money—has begun. The better course in such cases is to require the engineers in the field to make the first projection, which is simply sent in for examination and revision if necessary, so as to compel them to rely on their own intelligence and not on another's, and especially to give an indication of the extent to which their own skill can be relied on. For if unequal to making a tolerably correct projection in the first instance, it will probably be still more unequal to the more responsible duty of putting in the final line. For example, we recall an instance where an unusually accurate paper location, on a very steep side hill, gave a beautiful profile which no one could detect in the office to have any fault. The cut averaged about a foot, which was what prudence seemed to require, and what no one, certainly, in the office would have thought of objecting to. But just below the earth was rock, as a "practiced eye" might have detected in the field, and the earth itself was such as to make an unusually solid bank, so that when the line came to be constructed there was an ugly shallow rock cut on the inner edge and a broad solid platform for the road-bed nearly twice too wide, due to the unnecessary amount of excavation, which involved a loss of some $8,000 in much less than a mile, all of which might have been saved by throwing the line out three or four feet beyond the paper location. The writer of these lines was in part the guilty man; therefore, they are written with no prejudice against the proper use of topography, but such cases occur so frequently that the engineer who does not feel the limitations of the map and wish that he had the ground before him in making a paper location, and who does not feel that it may be, and probably is, susceptible of further improvement by further study in the field, will, we cannot but think, be wise to leave "railroad surveys and topography" alone, both in the field and in the office. We hope there have not really been any such among our correspondents, although in the heat of argument they will assert it.

As respects cases of larger errors, such as putting a line on the hill-side with a short tunnel, instead of in the bottom of the valley with a long tunnel, which one correspondent advances as an effect of neglecting topography, it is difficult to see how an error of judgment of that kind affects the question at all, unless an amount of accurate topography were taken which few would be disposed to defend. It is precisely such errors which over-reliance on topography is apt to lead to.

On the other hand, a marked advantage of topography which has not been alluded to is that needlessly bad alignment is far less likely than when "a good profile" alone is the criterion. An inexperienced man, especially, finds it far more easy to see on a contour map than on the ground that quite as good a profile can be obtained with, it may be, half the curvature.

The difficulty mentioned by one correspondent, that the stationing on maps and profiles often runs in reverse directions, is a frequent annoyance which only comes from carelessness, and can be remedied in part by turning the map upside down. Most engineers will disapprove of the suggestion made in the same connection, that the edges of field sheets should be "oriented" so as always to lie north and south, unless in special cases. It sacrifices in part the especial merit of the plan, that the line can be carried on indefinitely, as if on one sheet of paper, and always with a sufficient margin on each side of the line, without having any needless paper to take care of and file away in rolls.

Since writing the above we have received two further discussions of the subject, but as it has now been pretty thoroughly canvassed on both sides and summarized as fully as possible, it hardly seems profitable to continue the discussion further. There is truth on both sides. The use of contour maps is sometimes greatly abused, and from the facility which they lend for doing careless work off-hand, they are often worse than useless. It is equally true that in proportion to the skill and "eye for country" of the engineer, and the closeness of his personal supervision of the work, the amount of topography needed and taken may be diminished (in theory, and to some extent in practice) until the "vanishing point" is reached where little or no continuous and complete topography need be taken. But as almost every man, doing any thing in any way, is apt to overrate his own skill, this is a most dangerous principle to act on; and hence judiciously taken topography should be regarded as an essential for rough country and used as it should be used. One of our latest correspondents asserts that good work on steep slopes and grades, and with almost continuous 12 to 24-degree curves, can be done not only without the assistance of topography, but without the aid of "even a preliminary line of any sort," and with less "backing up" than with a paper location. We must confess that that is a "huckleberry above our persimmon," and should look with confidence to find any work done in that manner very ill done, since we should regard it as the first necessity for good location by any system (if indeed there can be said to be more than one system) to run a preliminary line over the whole route to find out what grades to use.

An admission is made by the same correspondent, however, which may well end the discussion: that either good or bad location may be made either with or without topography; that the result depends chiefly on the man. A good man will use every tool that will serve his end, and one of these tools is topography. Another one, at least equally essential, is shoe-leather.

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The size of a red flag may, it can be conceived, be a determining factor in favor of the safety of a train. Where, on a long tangent, dependence is placed on the runner's seeing a danger signal a considerable distance off, he may, if his train is a heavy freight, use up too much of his margin of safety before he sees the flag, if the latter is small, or faded, or dirty. The only right way, of course, is to carry the flag far enough to give the runner space to stop after he has passed it; but, as tending to induce habits of caution at all points, it is an excellent plan to require all danger flags to be *large* (say 30 to 40 in. square) and *bright*. We have been recently reminded of this by observing the contrast between the very large, bright flags used on some roads and the extremely dingy ones so common on others.

As bearing on the same point, it is well to remember that a red lantern loses a good portion of its effectiveness when held in the same hand with a white one. The latter dilutes the strength of the red quite appreciably and brakemen should be required to keep it out of sight when showing a danger signal.

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Two railroad matters of considerable interest before the Massachusetts Legislature are (1) the petition of the Boston & Lowell Railroad Company for an act confirming its leases of the Northern Railroad in New Hampshire and the Boston, Concord & Montreal Railroad, and (2) the disposition to be made of the Troy & Greenfield Railroad, which belongs to the state. The first of these matters has been vigorously opposed before the Railroad Committee by Col. George, the former counsel of the company, who charged violations of law by the management and a falsification of accounts, for which he demanded an investigation. The matter is still in the hands of the committee, but it is generally supposed that the desired bill will be reported. Whether there will be an investigation of the affairs of the company is uncertain, though in view of the serious charges made it would seem to

be policy on the part of the management to court an inquiry if they consider the charges unfounded.

What shall be done with the Troy & Greenfield Railroad and Hoosac Tunnel is a more difficult question, on which a committee is now engaged. Last year the Legislature directed the Governor and Council to examine the subject and report to the present Legislature. The Governor has recently transmitted a message on the subject, in which, after considering the present mode of operating the road, and the various schemes which have from time to time been suggested, he rejects them all as inadequate to secure all the advantages to Massachusetts which that costly line should afford, and concludes by recommending a consolidation of the east-and-west connecting lines under one management, which will secure a strong through line to the West. No approved scheme was proposed to the Governor and Council, and the message suggests no definite plan, though strongly advising consolidation in general terms. It is probable that one or more plans will be submitted to the committee, but whether they will lead to any practical result is exceedingly doubtful, in view of the very general feeling heretofore exhibited by the members of the Legislature, that the state should never part with the ownership or lose control of the operation of the road.

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The Grand Central Railroad of Belgium laid a quantity of steel rails in 1869. When they had been laid 12 years it had been necessary to renew less than 1 per cent. of them, and then they seemed to fail all at once, so that it was necessary to replace 48⅛ per cent. of them in the thirteenth and 50¾ per cent. in the fourteenth year. The best of the iron rails laid at the same time lasted but three years.

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The statistics of the American Iron and Steel Association show that the production of Bessemer steel ingots in the United States decreased from 1,477,346 gross tons in 1883 to 1,373,531 in 1884, or 7 per cent. The production last year was almost exactly the same as in 1881, when it was much greater than ever before. The progress of the production in this country and Great Britain since 1877 may be compared below—the British statistics have been reported by the British Iron Trade Association :

| Year. | United States. | Great Britain. | Year. | United States. | Great Britain. |
|---|---|---|---|---|---|
| 1878.. ... | 653,737 | 807,527 | 1882..... | 1,514,687 | 1,673,649 |
| 1879..... | 829,439 | 834,511 | 1883..... | 1,477,346 | 1,553 380 |
| 1880.. .. | 1,074,262 | 1,044,382 | 1884 ,.... | 1,373,531 | 1,299,676 |
| 1881..... | 1,374,247 | 1.441,719 | | | |

The production increased with almost equal rapidity in the two countries after 1878, and was larger here than in Great Britain in 1880 ; but the maximum here, in 1882, was 9½ per cent. less than there. The decrease since 1882 has been much greater in Great Britain than here—373,973 tons (22 per cent.) there, and 141,156 tons (9 per cent.) here ; and last year again our production was the larger.

The world's production of Bessemer steel ingots in 1880 and 1884 has been as follows:

| | 1884. | 1880. | Decrease. | P c. |
|---|---|---|---|---|
| United States..... | 1.373.531 | 1,074,262 | *299,269 | 27 8 |
| Great Britain ..... .. | 1,299,676 | 1,044,382 | 255.294 | 24.4 |
| Germany..... ..... | 1.055.462 | 720,010 | 335.452 | 46.6 |
| Belzium.... ..... | 179,489 | *120,000 | 59,489 | 49.5 |
| France ..... | 365,980 | *270,000 | 95,980 | 35.5 |
| Total ... . ... | 4,274,138 | 3,228,654 | 1,045,484 | 32.4 |

* The production in 1883; that in 1884 is not yet reported.

Thus, notwithstanding the considerable decrease last year, the production appears to have increased nearly one-third per cent. from 1880 to 1884. It has increased at a more rapid rate in Germany than here or in England, and the production there last year was but one-fifth less than in Great Britain. Evidently, Germany produces much more than it requires, and is largely supplying the requirements of other European countries.

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There was some increase in the Chicago shipments eastward last week, but they remained much below what they would have been but for the blockades of the previous weeks. There was an enormous amount of freight to be carried, the western roads having got through the cars which had long been delayed, but the tendency of such blockades is to accumulate the motive power at the east end of the roads, and it is some time before it and the rolling stock can be properly distributed again.

The Chicago shipments for the week ending Feb. 28 this year and in corresponding weeks of five previous years have been, in tons:

| 1880. | 1881. | 1882. | 1883. | 1884. | 1885 |
|---|---|---|---|---|---|
| 42,776 | 53,211 | 47,928 | 60,385 | 37,778 | 53,168 |

The shipments this year were thus exceeded only in 1881 and 1883, and in 1881 only by a trifle. They were 40⅜ per cent. more than last year.

For the last six weeks the total shipments and the percentage going by each railroad have been:

| | Week ending. | | | | | |
|---|---|---|---|---|---|---|
| *Tons:* | Jan. 24. | Jan 31. | Feb. 7. | Feb. 14. | Feb. 21. | Feb. 28. |
| Flour..... .... | 7,247 | 14.914 | 19,219 | 11,282 | 8,906 | 15.549 |
| Grain..... | 32,995 | 50,340 | 52,131 | 30,913 | 22,887 | 30,913 |
| Provisions ..... | 10,088 | 10,483 | 10,025 | 3,846 | 8,044 | 6,706 |
| Total..... | 50 330 | 75,737 | 81,375 | 46,041 | 39,837 | 53,168 |
| *Per cent.:* | | | | | | |
| C. & Grand T..... | 11.0 | 6.5 | 7.0 | 6.4 | 2.0 | 6 0 |
| Mich Cen..... | 24.4 | 29.0 | 8.3 | 5 8 | 15.3 | 11 0 |
| Lake Shore..... | 17.7 | 21 3 | 29.4 | 26.0 | 19.7 | 18.7 |
| Nickel Plate..... | 6.4 | 4 5 | 3.3 | 7.4 | 7.1 | 8.2 |
| Ft. Wayne..... | 8 8 | 13.6 | 20 0 | 12.8 | 20.8 | 22.5 |
| C., St. L & P..... | 14.4 | 7.0 | 11.0 | 19 8 | 12.0 | 13.8 |
| Balt & Ohio ..... | 3.6 | 7.4 | 7 8 | 6.2 | 9.6 | 9.1 |
| Ch. & Atlantic.... | 13.7 | 10.7 | 13.2 | 15.6 | 14.1 | 10.7 |
| Total..... ... | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Thus the shipments last week were one-third more than the week before, but one-third less than the week before the blockade. Compared with the week before there was an increase of 75 per cent in flour and of 35 per cent. in grain, but a decrease of 16¾ per cent. in provisions.

In percentages, the Chicago & Grand Trunk gained greatly over the week before, yet carried less than half its allotted share. The Fort Wayne carried a larger share than before for a long time. The three Vanderbilt roads together carried 37.9 per cent. of the whole, the two Pennsylvania roads, 36.3.

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The Agricultural Department of India reports that the average area of wheat in India of late years has been about 26,000,000 acres, and the average yield 10 bushels per acre. This year there has been a considerable increase in the area in several provinces and a decrease in a few.

So far as the statistics gathered show, they indicate an increase of about 800,000 acres, in area (about 3 per cent.), and a condition last January somewhat above an average—much above in some provinces, and considerably below in others. The harvest is in March and April, but if the wheat is in good condition in January, the crop is likely to be good. But even an increase of 10 per cent. over an average amounts to only 26,000,000 bushels, which, in a country of 250,000,000 inhabitants is absolutely insignificant. The exportable surplus will depend very much on the out-turn of other food crops, wheat probably forming less than one-fourth of the Indian breadstuffs.

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The New York, Lake Erie & Western report for January shows a large decrease in gross earnings, but a still larger one (29⅛ per cent.) in expenses, so that there was an increase of nearly 100 per cent. in the net earnings, after deducting the loss on the leased New York, Pennsylvania & Ohio road. This, however, is not a great gain in amount, for the total net last year was the insignificant sum of $85,773, and the $170,638 netted this year are little better than insignificant for a company which, like this, has average monthly charges of about $550,000. The fact is that the profits last year in January were much smaller than they have ever been in any other month before or since; and this year, after the increase of nearly 100 per cent., they are still smaller than in any other month of any year except the corresponding month of last year. The net earnings of the Erie proper in January for six years have been :

| 1880. | 1881. | 1882. | 1883. | 1884. | 1885. |
|---|---|---|---|---|---|
| $349,816 | $305,449 | $182,782 | $304.576 | $174,074 | $187.127 |

Thus on the Erie proper the net earnings were but $13,053 more this year than last, and nearly seven-eighths of the gain over last year was on the leased Ohio road. Last year the net earnings of this road lacked $88,300 of meeting the rental ; this year the deficit was only $16,499. The month was one of a very heavy movement of through freight from the West to the East ; but the rates were unsatisfactory, though probably on the average not much lower than last year.

For the four months of the fiscal year ending with January the net earnings, less the loss on the leased Ohio road, were:

| 1879-80. | 1880-81. | 1881-82. | 1882-83. | 1883-84. | 1884-85. |
|---|---|---|---|---|---|
| $1,973,503 | $2,434,740 | $1,829,425 | $2,146,850 | $1,855,512 | $1,636,649 |

Thus, the net earnings were less this year, were about one-sixth less than last year, and one-third less than in 1880–81, when they were largest; they were, however, slightly greater than in 1878–79.

For the four months there was a loss on the leased Ohio line amounting to $88,486 last year, while there was a profit of $83,609 this year.

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## Record of New Railroad Construction.

Information of the laying of track on new railroads in the current year is given in the present number of the *Railroad Gazette* as follows:

*Florida Railway & Navigation Co.*—This company's *Southern* Division is extended from Panasoffkee, Fla., southward to Withlacoochee, 15 miles.

*Pittsburgh, Chartiers & Youghiogheny.*—Extended from Junction No. 2 to Beechmont, Pa., 5 miles.

This is a total of 20 miles, making 127 miles thus far reported for the current year. The new track reported to the corresponding date for 14 years past has been :

| | Miles. | | Miles |
|---|---|---|---|
| 1885..... ..... | 127 | 1878... ..... .. | 204 |
| 1884... ... ..... | 213 | 1877 ..... | 82 |
| 1883..... | 261 | 1876... ..... | 252 |
| 1882..... | 609 | 1875.. ..... | 90 |
| 1881..... | 254 | 1874 ..... ... ..... | 161 |
| 1880..... | 575 | 1873.... ..... | 328 |
| 1879..... | 141 | 1872..... . ..... | 394 |

This statement covers *main track only*, second tracks and sidings not being included.

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## The New Orleans Exposition.

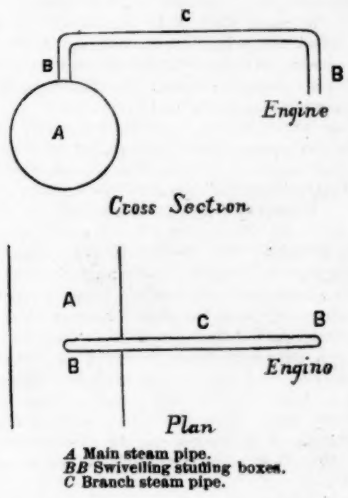
II.

Though wet and inclement weather still prevails, the attendance at the great Exhibition has shown a very considerable increase during the last few days, and should such a large number of visitors continue during the next three months, the present deficit will be somewhat reduced. The great crowds of visitors have shown very forcibly that a larger and speedier mode of conveyance than street cars ought to have been provided to obviate great discomfort and loss of time to those visiting the Exposition. The largest day's receipts indicate that some 21,000 persons paid for admission, but the total days' attendance is generally estimated at over 80,000.

The enormous extent of the electric lighting rather than the large amount of machinery in motion have necessitated a very extensive plant of stationary engines and shafting. Not only are all the numerous buildings, covering some 62½ acres, lit by five different systems of electric light, but the extensive grounds are lit by means of numerous large mast lights. As the weather grows warmer, this will no doubt convert the grounds into a very pleasant evening resort, but at present very few visitors remain after sundown, and the running of 67 dynamos, 4,600 incandescent lamps, and 1,380 arc lights seems a useless expense.

The engines employed in working the machinery and electric light develop in all about 5,400 indicated horse-power, of which no less than 2,500 horse-power is absorbed by the electric light. The arrangement of such an unprecedented amount of concentrated power demands some description, and while the credit of the success of the Exhibition must be given almost wholly to the exhibitors rather than to the management, it is satisfactory to note that the structural and engineering arrangements of the Exposition may be fairly awarded unqualified praise. The foundation being simply alluvial deposit of great depth, it is not unusual to find buildings in New Orleans that have sunk bodily 9, 10 and even 20 inches since they were erected. The difficulties therefore of erecting powerful engines driving long lines of shafting were considerable. These difficulties have been most successfully overcome. The gigantic engines work with absolute steadiness, while the shafting runs very smoothly, and the steam pipes are practically steam-tight, and efficiently protected from loss of heat.

The fifty-three boilers for supplying steam are mostly of a plain externally fired two-flued type, and are set in batteries of four or five boilers in brickwork. There are seventeen batteries in all, arranged in a line under a roof 400 ft. long, situated along the extreme western side of the Exposition grounds and 50 ft. from the main building. The main steam-pipe is in the form of the letter T in plan, the part of the steam-pipe corresponding to the top of the letter being 400 ft. long. This is connected by branch pipes to each battery of boilers. The largest engines are situated on each side of the stem of the T, which is 317 ft. long. The pipe is constructed




*A* Main steam pipe.
*BB* Swivelling stuffing boxes.
*C* Branch steam pipe.

of ⅜ in. steel plates, made in 30 ft. lengths at Pittsburgh. These lengths were riveted together on the ground, all seams being double-riveted throughout. The pipe is 30 in. diameter, and rests on rollers curved to the form of the pipe. The branches are all made of a ∩ form, one end of the ∩ being connected to the main pipe, and the other to the engine or boiler steam-pipe, as the case may be. Each end of the ∩ is provided with a peculiar stuffing-box, which allows the branch pipes to swivel slightly and alter their angle to the main pipe as the latter expands. The accompanying diagrams show the general arrangement.

Outside the building, the steam-pipe is above the boilers, but inside it is below the ground level, and consequently all the branch pipes rise from the main pipe to the engines, and steam is taken from the top or driest part of the pipe. The lowest part of the pipe, where it dips to enter the building, is provided with a cock, which is opened occasionally to blow off the condensed water.

Several very long branch pipes are used to convey steam to engines at a distance; one pipe is 1,900 ft. long, another 2,400 ft., and another to the saw-mill 1,100 ft. long. All these pipes are protected by Reed's steam-pipe covering, a substance resembling very stout gray paper, folded round the pipe, the butting edges being joined by a wire fastening. The covering is only comfortably warm to the hand.

The working engines are, with the exception of the Westinghouse automatic, all of the horizontal type, and are bolted down to foundations built of hard brick, laid in Portland cement. The brickwork rests on two layers of 3-in. planks, crossing one another at right angles. The Consulting Engineer of the Exposition, Capt. S. H. Gilman, who has had considerable experience in building foundations on the alluvial soil of New Orleans, considers the secret of success to be the limitation of the weight on the foundations to a figure not exceeding 800 lbs. per square foot. The two largest engines, the Harris-Corliss and the Reynolds-Corliss, having respectively 30 × 72 and 32 × 60 cylinders, stand on beds proportioned to give a pressure of only 600 lbs. per square foot. The foundation for each of these engines is stepped out to measure at the base about 70 ft. × 35 ft., and contains no less than 130,000 bricks, costing $11 per 1,000. The Portland cement cost $3.50 per barrel, and the whole cost of each of the large

engine-beds was no less than $3,500. As a softer machine-made brick might be had at $7 per $1,000 and an inferior cement at $1.50 per barrel, a cheaper foundation might have been secured, but the very satisfactory results obtained seem to justify the extra expense, and show what can be achieved in engine foundations on a mud soil.

In all some 46 engines are at work, and about 100 are running empty, making nearly 150 engines altogether in motion. The great majority of these engines are horizontal, with one cylinder, valve gearing of the Corliss type being predominant. The beam engine, so prominent at the Centennial, is conspicuous by its absence.

No official or complete catalogue being yet issued, it is practically impossible to find all the exhibits of any one class, especially as many exhibits of a similar kind are scattered all over the numerous buildings. In fact, classification of exhibits can hardly be said to exist, and one discovers a dusty heap of locomotive tires and springs wedged in between ice-making machinery and ornamental colored glassware. It is therefore difficult to speak positively, but so far a diligent search has failed to find a single compound engine, and the numerous types of marine engines appear to be represented only by a small launch engine of very poor design.

The largest engine at the Exposition is made by the Harris-Corliss Co., Providence, R. I., and runs one of the main lines of shafting. It is a very fine specimen of a large stationary engine, and excites much attention. The cylinder measures 30 in. diameter, with 72 in. stroke. The engine runs at 60 revolutions, and with 80 lbs. pressure is estimated to give off about 650 indicated horse-power, but no indicator cards have yet been taken. The valves have self-packing stems, no glands and stuffing-boxes being used. A collar on the stem is kept against a ground surface by the pressure of the steam. The engine is provided with a safeguard against running away should the regulator or governor break, a cam being thrown into gear which disconnects the valve gear. The flywheel rim is made in ten segments, and is 24 ft. diameter, with a 6 ft. face, curved ⅛ in. per foot of width. The flywheel weighs 40 tons, but is not the largest made by the firm; a flywheel at New Bedford, Mass., measuring 30 ft. diameter with 110 in. face. The main shaft is 15 in. diameter. A 60 in. Gandy's patent cotton belt is used, and appears to run very well and evenly. We understand it has only been once tightened since the Exhibition started. The engine measures 31 ft. 2 in. from centre of shaft to end of cylinder.

The next largest engine is a Reynolds-Corliss, made by E. P. Allis, Milwaukee, Wis. This engine has a 32 in. × 60 in. cylinder, and is of somewhat novel construction. The main bed-plate, instead of being in one casting, is for convenience of transport made in several pieces. One large casting carries the main plummer block, and is bolted down by six 2¼ in. bolts. It is secured to the cylinders by two stout wrought-iron horizontal columns, forged out of scrap iron. The ends of these columns are keyed respectively to the cylinder cover and the main plummer block casting. For the greater part of their length the columns are of circular section, but are made square for a length sufficient to act as slide bars. The slide blocks are made of Babbitt metal. The valves are on the Corliss principle, but are somewhat modified in design. The advantages claimed are greater wearing surface in the valves, and an easier release, which renders the cut-off more susceptible to the action of the governor.

The main driving belt used on this engine is 48 in. wide, and is made by Josiah Gates, Lowell, Mass.

Several of the well-known Armington & Sims engines are shown at work. The Buckeye Engine Co., of Salem, Ohio, exhibits an engine with 15 in. × 27 in. cylinder.

The Payne automatic engine, manufactured at Elmira, N. Y., is also shown at work, and appears to be of excellent design and workmanship. The New York Safety Engine Co. exhibits four engines with 10 in. × 12 in. cylinders. These engines have piston valves, two flywheels and crank disks, run at a high speed, and appear to give great satisfaction. Several of the Westinghouse automatic engines are also shown at work.

Messrs. Hewes & Phillips, of Newark, N. J., show a 100 horse-power engine of their make at work.

The Payne and some other engines use a cotton belt lined with leather, made by the Underwood Manufacturing Co., of Tolland, Ohio.

The number of stationary engines exhibited is so large that any exhaustive description is impossible within the limits of our space.

The Exposition affords intending purchasers of stationary engines a convenient opportunity of inquiring into the relative merits of different kinds of engines. Where several rival engines are all running together it is easy to compare meritorious points and difficult to conceal defects, and a careful inquiry will elicit some valuable information from the users of the power as to the regularity of running, freedom from breakdowns, etc. Perfection as regards the last point has not yet been attained, three large engines representing three of the best known types having found it necessary to stop unexpectedly for repairs the other day, with the result that the electric light was replaced by candles in part of the buildings and out of doors was practically suspended. Other makes of engines again are stated to have run without a breakdown since the opening of the Exposition.

There are in all about 11,000 ft. of main shafting, the lengths nearest the engines being 6 in. diameter, diminishing to 2 in. diameter at the ends. It is all cold rolled, and was supplied by Jones & Loughlin, of Pittsburgh. The only collars on each line of shafting are those on each side of the bearing next the main pulley. Each line of shafting is about 1,400 ft. long, the power being applied in the centre of this length. In order to provide against any unequal settlement of the supports carrying the shafting, universal joints are provided at every 100 ft. The shafting is, however, supported in a very substantial manner. The bearings on each side of the main driving pulleys are carried on a framing composed of six 14-in. vertical pitch pine posts, well braced and tied together. Each post is sunk 16 ft. into the ground by what is locally known as the "water and sand process." A hole, large enough to receive the post, is bored some 16 ft into the ground. The post being placed upright in this hole water is poured in. Fine, sharp white sand is then filled in, driving the water out and leaving the post perfectly firm and immovable.

The engines exhaust into a large pipe, situated below ground and alongside the main steam pipe. This exhaust pipe is carried up vertically some 20 ft., where it emerges outside the building. The hot condensed water drains into a tank, and is mixed with the cold feed water from the Mississippi. The addition of this hot water throws down most of the impurities contained in the river water. The feed is then pumped into four feed pipes running inside the exhaust pipe, and is thus further heated to 215° Fahr. The feed then flows into one large feed pipe, which has branches to the different boilers. Each branch is provided with a globe valve, by means of which the attendant can regulate the amount of feed. One of Geo. F. Blake's pumps supplies the whole of the boilers. The man working the pump has in front of him two pressure gauges, one showing the pressure in the main steam pipe, and the other the pressure in the main feed pipe. He has simply to work his pump so as to keep the feed pipe pressure 20 lbs. above the steam pipe pressure. The feed is then certain to flow into any of the boilers. The boilers are set to blow off at about 80 lbs., and consequently the feed pipe pressure is kept at about 100 lbs. per square inch.

## Questions Concerning Track in Germany.

The Technical Committee of the German Railroad Union prepared for answer by the railroads belonging to the Union a schedule of 157 questions, which were issued March 19, 1883. The answers received and the conclusions drawn by the reporter for each subject were submitted to the tenth technical convention of the Union in Berlin last July, and have now been published. In all this work individuals are not recognized. Railroad *managements* are appointed members of the Technical Committee and a railroad, not any particular person on a railroad, to report on the different subjects. It is noticeable that concerning a great many questions no definite conclusions are arrived at, and the reporters rarely cite the experiences given in answer to the questions, but give their conclusions in the briefest form, with very little or no discussion of the facts contained in the answers rendered by the different railroads.

We give below some of the conclusions reported on the questions concerning construction of track, of which questions 36 were asked in the circulars.

1. *Length of Rails.*—The length of 9 metres (29½ ft.) is preferred. Three railroads have tried longer rails—32 ft., 33 ft., and 39 ft. 4 in., without inconvenience.

2. *Wear and Breakage of Hard and Soft Steel Rails.*—From the observations so far made, it is impossible to draw definite conclusions as to the effect of different degrees of hardness on the wear and breakage of steel rails. The hardest rails seem more liable to break, but they resist wear much better than soft rails. It seems that the perfect purity of the metal exercises a great influence on the top of the rails in both cases. No observation has indicated that soft rails wear best.

3. *Flexure of Web of Rail under Ordinary Service.*—No one has reported any such flexure.

4. *Rail-bending Machines.*—The machines most employed are those of Schrabetz, of Voljacek, of Pressler-Thomas and of Köbler. The Voljacek is best fitted for corners of short radius. The machines best for different lengths of iron and steel rails cannot be specified.

5. *Length of Cross-ties.*—The great majority of managements prefer a length of 2.50 metres (8 ft. 3 in.) for main tracks; but those which have used ties but 2.40 metres (7 ft. 11 in.) long find the length sufficient. Most managements which work local railroads believe that 7 ft. 7 in. is sufficient for them.

6. *Preserving Ties.*—The methods in use and the number of roads using each at the time of four different reports have been:

| | 1865. | 1868. | 1878. | 1884. |
|---|---|---|---|---|
| Sulphate of copper | 15 | 6 | 5 | 1 |
| Sulphate of iron and sulphate of zinc. | 1 | .. | .. | .. |
| Sulphate of barium and protoxide of iron | 2 | .. | .. | .. |
| Corrosive sublimate | 3 | 6 | 8 | 4 |
| Chloride of zinc | 8 | 7 | 20 | 22 |
| Creosote | 4 | 5 | 13 | 11 |
| Chloride of zinc and creosote mixed | .. | .. | 4 | 7 |
| Vapor of creosote (Paradis' patent) | .. | .. | .. | 1 |
| Vapor of creosote and creosote (Blythe's system) | .. | .. | 1 | 1 |
| An antiseptic injected under pressure | .. | .. | .. | 1 |

There are cases where one management uses several systems, and since 1878 the union of several lines in one system (especially by the purchase of Prussian railroads by the government) has caused a reduction in the number using some systems without any real reduction in their use.

The use of sulphate of copper, corrosive sublimate and creosote is becoming less common, while the use of chloride of zinc alone and of the same mixed with creosote is becoming general.

The cost per tie by the different methods now in use is, in cents:

| | Oak. | Beech. | Fir. |
|---|---|---|---|
| Creosote | 25 | 47½ | 43 |
| Chloride of zinc | 9 | 11 | 12 |
| Chloride of zinc and creosote | 15 | 21½ | 19 |
| Corrosive sublimate | .... | .... | 19 |
| Blythe system | 14½ | .... | 15 |
| Paradis system | .... | 19 | .. |

The few statistics of comparative results show clearly an important prolongation of the life of ties due to treatment, and the roads which have no statistics are of that opinion also. No management which has used any system intends to give up treating ties.

As the results obtained by lines which have for 25 or 30 years used chloride of zinc, creosote and corrosive sublimate are substantially the same, and as the cost of the chloride of zinc process is only one half or one fourth that of the others, most railroads adopt the zinc process. Experience is not yet sufficient to show whether there is an advantage in using creosote with chloride of zinc corresponding with the increase in expense, which is 57 per cent. for oak ties, 64 for beech, and 94 per cent for fir.

As the mechanical wear affects the life of ties somewhat, it is on roads with light traffic, or using soft ties, that the economy of treatment is most marked. To get the full advantage of treatment on main lines it seems advisable to use chairs to prevent the mechanical wear.

*Joint Fastenings.*—For suspended joints with T rails and wood cross-ties most railroads recommend angle fish-plates on both sides of the rail, provided with notches for the spikes. As to the proportion that should exist between the strength of the fish-plate and that of the rail, 28 railroad managements think that the resistance of the fish-plates should nearly equal that of the rail at the point where the ties are furthest apart. The percentage of the resistance of the rail resistance that the splice must possess has been fixed by 9 managements at less than 30 per cent.; by 9 managements at 30 to 50 per cent.; by 8 managements at 50 to 80 per cent. Two managements think that the resistance of the turn should be nearly identical.

8. *Screws and Spikes and the Material for them.*—Most roads that have used screw spikes recommend their use only on the inside of the rail, and the employment of hook-headed spikes on the outside, using chairs at the same time.

Most roads now use wrought iron exclusively for screws and spikes. In view of the favorable results obtained by certain managements with cast iron-spikes, it is recommended that experiments with them be continued on a larger scale.

*Iron Sleepers.*—The use of metallic superstructure is still generally experimental. Decisive conclusions as to the preference to be given among the different systems cannot yet be drawn.

Where longitudinal iron sleepers are used it is absolutely necessary to have the road bed ballasted with a thick and porous bed composed of materials which are neither earthy nor sandy (clean gravel or broken stones), and to make the drainage as perfect as possible. And it must be borne in mind that experience shows that after a time the drains cease to work. All methods used have been found safe.

For maintaining level surface, good alignment and gauge, opinions differ whether longitudinal or transverse metal sleepers are preferable.

Experience is not yet sufficient to show which is least costly to maintain.

A superstructure with transverse sleepers seems to satisfy all requirements, provided that a suitable profile is chosen and that the sleepers are large enough and are entirely covered with ballast.

As to the proper form and weight of the metal sleepers, their height, the weight of rail suitable to them, and the method of uniting the rail to its support, experience is not yet sufficient to permit a safe decision. The method of fastening by bolts is more used than that by wedges.

It is not yet known how long iron sleepers will last.

The indications are that iron cross-ties should be 2.50 metres (8 ft. 3 in.) long, more than 2½ in. high, and that the thickness of the top plate should at least 0.4 in.

13. *Effect of Rust on Iron Sleepers.*—No injurious effect has been observed under ordinary circumstances when the road-bed has been well drained.

14. *Joint-fastening of Longitudinal Iron Sleepers.*—Fish-plates the whole width of the sleepers are generally considered necessary and have given good results.

*Elevation of Outer Rail and Widening of Gauge on Curves.*—The superelevation which has been prescribed by the railroads, based on the maximum speed of trains, has resulted satisfactorily as regards safety, but not as regards the wear of the side of the rail-heads and flanges of wheels, where many freight trains run at a speed much less than that of the fast trains. It is recommended to avoid sharp curves where this is necessary, and, if that cannot be done, to make rules limiting the speed of all trains on these curves.

The widening of the gauge prescribed has had the desired effect, both as to safety and as to wear, except when it has reached or been near the minimum allowed. It is therefore recommended that the increase of width on curves should not be too much restricted.

19. *Even and Broken Joints on Curves.*—Broken joints cannot be recommended on lines of the first rank.

20. *Suspended Joints.*—The results of recent experience are as favorable as those previously obtained. The suspended joint is advantageous on account of the easy movement of cars over it and the greater safety that results on account of less wear of rail-ends and cars, and a reduction of maintenance expenses. Without dispute, it is preferable to the supported joint.

But to obtain these advantages a rail profile must be used that offers sufficient resistance, and a fish-plate suited to the nature of a suspended joint. Moreover, the ties next the joint must not be too far apart.

22. *Creeping of Rails.*—The results of experience and the opinions on the different roads vary greatly. In spite of all efforts the creeping of rails has continued; but it has been kept within limits by many different methods. Most managements think that the best method is to use angle splice-bars provided with notches. It is noticeable that the oldest and simplest method, by notching the foot of the rail which most have hesitated to use for steel rails, is employed with success by some railroads of considerable extent. On account of the good results obtained in recent experiments, it is desirable that these trials be continued.

Resistance to creeping depends, aside from special provisions against it, on the good condition of the superstructure. Special value is placed on the solid attachment of the rails to the ties, to placing the ties radially on curves, to good condition of the road-bed, and to proper ballasting of the ties with gravel or broken stone.

23. *Creeping of Rails on Bridges.*—Special methods must be used to prevent this, especially on long bridges, and the track on the grades of the approaches must be carefully watched, in order to maintain the spaces necessary for expansion and contraction by changes in temperature.

When the creeping of the rails cannot be prevented by means disconnected with the bridge structure, it will not do to try to prevent it by an inflexible attachment of the rails to the beams of the bridge.

26. *The Life of Iron Bridges.*—Iron bridges have not been built long enough to make it possible to estimate their probable life. Renewals heretofore have been because of the greater weight of the locomotives recently introduced, which exceeds considerably the loads which the bridges were originally intended to carry.

27. *Cost of Maintaining Iron Bridges.*—Aside from painting, the cost of maintenance is generally inconsiderable. Considerable expenditures have been incurred however for the superstructure of a bridge of the Pauli system over the Rhine at Mayence, and for one of the Schiffkorn system on the Transylvania Railroad.

*Steel and Cast Iron in Construction especially, in Bridges.*—So far but little use has been made of them in construction, and especially in railroad bridges. The experience acquired does not warrant a decisive opinion on the results of their use.

30. *Painting Iron Bridges.*—In almost all cases ordinary

oil paint is used. Recently various other special paints have been tried. The durability of the paint depends chiefly on climatic or local conditions, the quality of the materials and the care with which the work is done. Taking into account all these conditions, the minimum life of ordinary oil painting is about three years; the maximum, 10 to 12 years, and the average five or six years.

31. *Preventing Rust in Bridges.*—Efficient means for this are not yet known. The best consists in first cleaning the iron both by mechanical and chemical means, then painting with boiling drying oil and then an ordinary coat of oil paint.

To preserve parts exposed to the dampness of the earth, they are coated with coal tar

Experiments on a large scale with galvanizing are recommended.

## TECHNICAL.

### Tunnels on South Pennsylvania Railroad.

*Engineering News* gives the following table of progress on the numerous long tunnels of that line:

| Name. | Length. Feet. | Progress, both ends, to Sept. 6, 1884. Feet. | Feb. 1, 1885. Feet. | Remaining undone. Feet. |
|---|---|---|---|---|
| Blue Mt. | 4,240 | 350 | 1,610 | 2,630 |
| Kittatinny | 4,620 | 850 | 2,280 | 2,340 |
| Tuscarora | 5,225 | 750 | 1,967 | 3,258 |
| Sideling Hill | 6,662 | 560 | 1,632 | 5,030 |
| Ray's Hill | 3,534 | 570 | 1,234 | 2,300 |
| Allegheny Mt. | 5,900 | 1,060 | 2,230 | 3,670 |
| Laurel Hill | 5,400 | 700 | 990 | 4,410 |
| Negro Mt. | 1,050 | 0 | 100 | 950 |
| Quemahoning | 800 | 0 | No record | No record |

The work has recently been delayed on several of the tunnels by the freezing up of the streams supplying the compressors. Progress per month on the five leading tunnels would appear from the above to have been about 250, 280, 240, 210 and 230 ft. respectively, with two headings—a remarkably uniform rate of progress for five separate tunnels, and absolutely very good progress for works of this kind, although the St. Gothard tunnel (with which comparison is of course not fair) made much more than twice this progress, as an average, for years together, and in the best month of each year would often double its average. The average work at the Hoosac, with which comparison is fairer, corresponds closely with the above during the closing years of its construction.

### Cost of Mining Anthracite Coal.

The cost of producing anthracite coal at the mines of the companies controlled by the Pennsylvania Railroad Co. was last year, in cents per ton:

| | Inside. | Outside. | Other. | Total. | Tons mined. |
|---|---|---|---|---|---|
| Lykens Valley | 228.03 | 69.29 | 38.72 | 336.04 | 185,923 |
| Mineral R. R. & Mining Co. | 118.73 | 47.07 | 44.01 | 209.81 | 401,892 |
| Summit Branch | 146.74 | 42 23 | 11.29 | 200.26 | 364,545 |
| Susquehanna Coal Co | 95.36 | 26 70 | 20.94 | 143.00 | 1,289,324 |

The average receipt per ton at mines was: Lykens Valley, $2.65, a loss of 71.04 cents per ton; Mineral, $1.97, a loss of 12.81 cents; Summit Branch, $2.85, a profit of 84.74 cents; Susquehanna, $1.84, a profit of 41 cents per ton. The receipts do not include royalties, rents or other profits, but only the actual sale price of coal.

In this statement the inside expenses include all work and repairs in the mine; the outside expenses, the cost of preparing coal at the breaker, office expenses, superintendence, hauling and similar charges; and the other expenses include taxes, royalties, depreciation fund, insurance and improvements.

### Cross-ties on French Railroads.

From the returns of the six great companies in France for the five years 1878–82, it appears that the average annual consumption amounted (on 12,720 miles, average length of line open, or 18,660 miles of single track) to 147 ties per mile of single track. Cross-ties of oak are the most common, constituting two-thirds of the whole number; beech constitutes one-fifth; pine and pitch-pine, about one-ninth; and lastly, fir, little more than 1 per cent. If an allowance of 25 per cent. of the total length of single track be made for sidings, the total amounts to 23,325 miles, and the consumption to only 118 ties per mile. The annual rate of consumption varies with the kind of wood used, but the average annual cost per mile is approximately uniform at $145 per mile.

Iron cross-ties, which have been so extensively introduced in Germany and (to a small extent) in England, are as yet wholly in the experimental stage in France.

### Snow and Shop Work.

The Aurora, Ill., *Beacon*, of Feb. 25, speaking of the shops of the Chicago, Burlington & Quincy Railroad, says:

"The wreckage of cars and engines brought in from various points has been accumulating very rapidly at the shops for a few days past, several of the engines being so completely demolished that the pieces were brought in on flat cars, and might almost have been loaded with scoop shovels."

And again:

"The machinists of the locomotive department will gladly welcome the approach of spring. So many engines are being wrecked or damaged during the severe weather and frequent snow blockades, that the machinists are crowded with work day and night on repairs. It is nothing uncommon for all the pit men and some of the lathe men to work all night."

### The Cold Weather and Broken Rails.

On one of the best parts of one of the best railroads in Illinois, down to the first week of February, 40 broken rails had been found in a section of six miles. During one intensely cold night the two trackmen who walked over the section found *five* broken rails.

### Interlocking Signals and Switches.

The Baltimore & Ohio Railroad Co. has lately erected at the Relay (the junction of the Main Stem and Washington Branch, near Baltimore), a system of improved interlocking signals and switches, which will very much facilitate the movement of their immense traffic at that place, and also conduce to the safety of passengers. The eight switches by which the trains are conducted in the desired directions are operated by rods which connect to interlocking levers in a signal tower, and can be placed as required by the signalman with great celerity. Approaching the Relay from either side, the trains find at the distance of about 2,000 ft. distant or caution semaphore signals. When these do not indicate safety the trains must move with caution up to the semaphore (home) signals, which are located near the switches, and stand until the signals are cleared. It is mechanically impossible for the signalman to place any of the signals in the position which indicates safety until the switches are first set properly and locked by a bolt which throws into the rod of the switch. By this system all danger of collision will be overcome, and the Baltimore & Ohio will be able to move their fastest trains at full speed with perfect safety. There are 8 switches, with their respective facing point locks, and 14 semaphore signals operated by the interlocking levers. The apparatus has been furnished by the Pennsylvania Steel Co., of Steelton, Pa., erected under supervision by the Baltimore & Ohio Railroad.

# General Railroad News.

## MEETINGS AND ANNOUNCEMENTS.

### Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Chicago, St. Louis & Pittsburgh*, annual meeting, in Indianapolis, March 18.

*Denver & Rio Grande*, meeting of the consolidated bondholders for consultation with the trustees, at No. 21 Nassau street, New York, at 1 p. m., on April 16.

*Florida Railway & Navigation Co.*, annual meeting, in Fernandina, Fla., March 17, at noon.

*Illinois Central*, annual meeting, at the office in Chicago, March 11.

*Louisville, New Albany & Chicago*, annual meeting, at the office, No. 29 Nassau street, New York, March 11, at noon. Transfer books close from Feb. 28 to March 12.

*Missouri Pacific*, annual meeting, at the office in St. Louis, at 9 a. m. on March 10.

*Pennsylvania Railroad*, annual meeting, in Musical Fund Hall, in Philadelphia, at 11 a. m. on March 10.

*Union Pacific*, annual meeting, at the office, in Boston, March 25.

*Wabash, St. Louis & Pacific*, annual meeting, at the office in St. Louis, at 9 a. m. on March 10.

### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Atlanta & Charlotte Air Line* (leased to Richmond & Danville), 2½ per cent., semi-annual, payable March 6.

*Boston & Albany*, 2 per cent., quarterly, payable March 31, to stockholders of record on Feb. 28.

*Fort Wayne & Jackson* (leased to Lake Shore & Michigan Southern), 2¾ per cent., semi-annual, on the preferred stock, payable March 2.

*North Carolina* (leased to Richmond & Danville), 6 per cent., yearly, one-half payable March 10 and one-half Sept. 10.

*Sunbury & Lewistown* (leased to Pennsylvania Railroad Co.), 3 per cent., semi-annual, payable April 1.

*West Jersey*, 3 per cent., semi-annual, payable March 16.

### Baltimore & Ohio Employes' Relief Association.

The January sheet of this Association shows payments of benefits during the month as follows: Main Stem, Transportation Department, 131; Machinery Department, 188; Road Department, 99; Baltimore & Philadelphia, 2; Trans-Ohio divisions, 138; Pittsburgh Division, 61; physicians' bills, 315 total, 934.

## ELECTIONS AND APPOINTMENTS.

*Baltimore & Ohio Employés' Relief Association.*—At the election for members of the Committee of Management, held recently, the following were elected: Main Stem, W. M. Clements and A. J. Cromwell; Trans-Ohio divisions, W. H. Harrison and E. L. Weisgerber; Pittsburgh Division, J. E. Sampsel. These elections are for the year beginning July 1 next. The elections for the trustees of the Savings Fund and Building Feature resulted in the choice of Messrs. S. H. Trigg and Sylvester Osborn.

*Beech Creek, Clearfield & Southwestern.*—Cornelius Vanderbilt has been elected Vice-President of this company, in place of J. G. Reading, retaining also the office of Treasurer; F. E. Herriman is Assistant General Freight and Passenger Agent, with office at Jersey Shore, Pa.

*Bennington & Rutland.*—J. G. McCullough is now President of this company, with office at North Bennington, Vt.; F. B. Jennings is Vice-President, with office at New York; E. D. Bennett is Superintendent, with office at Bennington, Vt.

*Brunswick & Western.*—At the annual meeting of this company, March 2, the following directors were chosen: George L. Zabriskie, Charles L. Schlatter, Edward W. Kinsley, T. W. Lillie, Henry Tahlman, Henry Kavanagh, L. P. Goodyear. This board organized by the election of Edward W. Kinsley as President; T. W. Lillie, Secretary and Treasurer.

Mr. C. R. Wise has been appointed Assistant General Manager of the road.

*California Fast Freight Line.*—Mr. Samuel De Bow has been appointed General Manager, with headquarters in Chicago.

*Camden & Atlantic.*—At the annual meeting at Cooper's Point, N. J., Feb. 27, the following directors were elected: William L. Elkins, James B. Dayton, Frank Thomson, Richard D. Barclay, Thomas H. Dudley, Joseph N. DuBarry, William C. Houston, Edmund E. Read, Henry D. Welsh, William Bettle, John B. Hay, Enoch A. Doughty, Crawford Miller. The board organized as follows: President, William L. Elkins; Vice-President, William J. Sewell; Secretary, D. M. Zimmerman; Treasurer, William Taylor.

*Canadian Pacific.*—Mr. W. H. Kelson, heretofore General Storekeeper at Winnipeg, has been transferred to Montreal, and will have charge of the company's stores on all divisions. He will have charge also of the accounts of the Mechanical and Fuel departments.

*Cape Fear & Yadkin Valley.*—The appointment of Mr. W. M. S. Dunn, as General Superintendent of this road was noted last week. Mr. James S. Morrison, for some time past Chief Engineer and General Superintendent, remains with the road as Chief Engineer, the increasing length of the road and the heavy work required on its extension giving him full occupation for his time in that position alone.

*Chesapeake & Ohio.*—Mr. C. H. Hudson having resigned, the duties of the office of Superintendent of Transportation will for the present be performed by the General Manager.

*Chicago & Eastern Illinois.*—Mr. J. L. Prindle has been appointed Chief Train Dispatcher in place of A. W. Leitnaker, resigned.

*Chicago & Northwestern.*—Mr. H. K. McCullough, the new General Freight Agent, has issued the following notice, dated March 1:

"Taking effect this date, the organization of the General Freight Department will be as follows:

"C. H. Knapp, First Assistant General Freight Agent; office, Chicago.

"Peter Hallenbeck, Assistant General Freight Agent of the Winona & St. Peter Railroad and the Dakota divisions and branches (except the line south of Iroquois); office, Winona, Minn.

"Emmons Blaine, Division Freight Agent of the Iowa and Northern Iowa divisions, and the Dakota Division, south of Iroquois; office, Chicago.

"E. J. Foster, Division Freight Agent of the Madison and Galena divisions; office, Chicago.

"Burton Johnson, Division Freight Agent of the Wisconsin and Peninsula divisions; office, Chicago.

"The assistant general freight agents and commercial and general agents will report to the General Freight Agent. Division freight agents will report to the First Assistant General Freight Agent. Traveling freight agents will report to, and station agents will correspond with, the division freight agent of their division."

*Chicago & Western Indiana.*—Mr. G. W. Stokes has been appointed Secretary and Auditor in place of A. S. Dunham, resigned, to date from March 15.

*Cincinnati, Hamilton & Dayton.*—The following changes took place Feb. 1: Mr. A. E. Lippincott, Central Passenger Agent, in place of Mr. W. S. Matthias, resigned; Mr. J. F. McCarthy, Southern Passenger Agent, in place of Mr. D. G. Edwards, resigned; Mr. C. L. Paris, City Passenger Agent for Cincinnati.

*Clearfield & Jefferson.*—The directors of this new company are as follows: Charles F. Berwind, Aaron Fries, John Reilly, Samuel G. Lewis, F. R. Lewis, J. H. Converse and Allison White, all of Philadelphia. Mr. Charles F. Berwind is President.

*Cleveland, Columbus, Cincinnati & Indianapolis.*—At the annual meeting in Cleveland, O., March 4, the following directors (one-third of the board) were re-elected for three years: William H. Vanderbilt, Cornelius Vanderbilt, William K. Vanderbilt, James H. Rutter, New York; Amos Townsend, Cleveland. The directors met and re-elected the former officers: J. H. Devereux, President; Stevenson Burke, Vice-President; George H. Russell, Treasurer; P. A. Hewitt, Auditor; E. B. Thomas, General Manager; A. B. Skinner, Traffic Manager; Lucien Hills, General Freight Agent; A. J. Smith, General Passenger Agent; Robert Blee, J. P. Ewan, F. W. Burroughs and J. H. Barrett, Superintendents of divisions.

*Dayton & Union.*—This company has re-elected C. C. Waite, President; E. B. Thomas, General Manager; Geo. H. Russell, Secretary & Treasurer.

*Denver & Rio Grande.*—Mr. David H. Moffatt, late Second Vice-President, has been chosen President in place of Frederick Lovejoy, resigned.

*Fitchburg.*—Mr. George Foye has been appointed General Baggage Agent of this road and Station-master in Boston in place of A. H. Brown, resigned. Mr. Foye is an old conductor on the road.

*Housatonic.*—At the annual meeting of this company in Bridgeport, Conn., Feb. 27, the following directors were elected: William H. Barnum, David Draper, William D. Bishop, A. B. Mygatt, Horace Nichols, Edward Leavitt, William E. Downs, John B. Peck, C. K. Averill. At a subsequent meeting of the board W. H. Barnum was elected President; David Draper, Vice-President; C. K. Averill, Secretary and Treasurer.

*Lawrence.*—At the annual meeting in Pittsburgh, Feb. 27, the following directors were chosen: L. H. Meyer, Charles W. Cass, Charles Lanier, New York; J. N. McCullough, John B. Jackson, Pittsburgh; R. W. Cunningham, New Castle, Pa.; John N. Hutchison, Philadelphia. The road is leased to the Pennsylvania Company.

*Lehigh & Wilkes-Barre Coal Co.*—At the annual meeting of the stockholders in Philadelphia, Feb. 26, the following officers were elected: President, William H. Tillinghast; directors, F. A. Connelly, John Kean, George de B. Keim, E. C. Knight, B. Williamson.

*Lowell & Andover.*—This company has re-elected Frederick Ayer, President, with the old board of managers. The road is leased to the Boston & Maine.

*Mexican National.*—The following circular from Vice-President Thomas C. Purdy is dated City of Mexico, Feb. 16:

"Mr. W. E. Lewis has been appointed General Superintendent of all the lines operated by this company south of San Luis Potosi, including the Zacatecas Railroad. All operating officers, except the General Freight Agent, Auditor and Supply Agent, will report to him.

"The title of Chas. Langrand, Manager of the Zacatecas Railroad, is hereby changed to Superintendent of the Zacatecas Division, and the title of Santiago Mendez to that of Supply Agent.

"The General Freight Agent, Auditor and Supply Agent will report to the Vice-President. The Acting Chief Engineer will report to the General Superintendent in all matters relating to repairs of road, and to the Vice-President in relation to betterments or construction."

*Newport & Cincinnati Bridge Co.*—This company has elected Thomas D. Messler, President; Albert S. Berry, Vice President; S. B. Liggett, Secretary; John E. Davidson, Treasurer; Ralph Peters, Superintendent.

*Northern Central.*—At the annual meeting in Baltimore, Feb. 26, the following directors were elected: George B. Roberts, Wistar Morris, Samuel C. Huey, John P. Green, Edmund Smith, George Small, B. F. Newcomer, J. N. Hutchinson, Dell Noblit, Harry Walters, Henry Gilbert and Henry James. Subsequently the board elected the following officers: President, George B. Roberts; Vice-President, Frank Thomson; Treasurer, J. S. Leib; Secretary, Stephen W. White. President Roberts resigned his position as director, and Mr. A. J. Cassatt was elected to fill the vacancy, the President of this company being, under its charter, chosen from outside of the board.

*Oregon Railway & Navigation Co.*—Mr. C. W Taylor has been appointed Superintendent of the Baker City Branch, with office at La Grande, Oregon.

*Texas & Pacific.*—At the annual meeting in New York, March 3, the following directors were elected: Jay Gould, R. C. Hayes, Russell Sage, T. T. Eckert, George J. Gould, F. L. Ames, A. L. Hopkins, J. C. Brown, J. A. Wright, J. Markoe, James P. Scott, Charles O. Baird, J. C. Bullitt, Isaac J. Wistar, J. H. Hutchinson, William D. Winston and George B. Roberts. The board includes eight representatives of the Gould interest and eight bondholders, with Mr. George B. Roberts as a neutral, holding the balance.

*Philadelphia & Reading.*—Mr. G. W. Twining has been appointed Superintendent of the Lehigh & Susquehanna Division, to take effect March 1, vice Mr. W. S. Polhemus, resigned.

Mr. J. H. Thompson has been appointed Division Engineer of the Lehigh & Susquehanna Division, to take effect March 1, vice Mr. G. W. Twining, appointed Superintendent.

*St. Paul, Minneapolis & Manitoba.*—Mr. Thomas Downing has been appointed Master Mechanic in place of H. Middleton, resigned, with office in St. Paul, Minn. Mr. Downing has been for 5 years past Division Master Mechanic on the road, and was previously on the Minneapolis & St. Louis.

*Sharpsville.*—J. B. Washington is now Treasurer and Auditor of this company, as well as Vice-President; S. K. Harris is Secretary, in place of Frank Pierce.

*Southern Central.*—The traffic of this road is now in charge of Mr. John Taylor, General Traffic Manager of the Lehigh

Valley Railroad. Communications in relation to passenger business should be sent to H. D. Titus, Acting Superintendent, who will have charge of the business, under the supervision of Mr. E. B. Byington, General Passenger Agent. Letters in relation to freight business should be sent to John Whittle, Assistant General Freight Agent of the Lehigh Valley road. Car reports should be sent to A. P. Blakslee, Car Accountant of the Lehigh Valley road.

*Southern Pacific.*—Under the new consolidated system the officers of this road will be as follows: General Manager Pacific system, A. N. Towne, San Francisco; General Manager Atlantic system, A. C. Hutchinson, New Orleans; General Traffic Manager, J. C. Stubbs, San Francisco.

Other appointments for the Atlantic system (the lines east of El Paso to New Orleans) are: J. G. Schriever, Assistant to the General Manager; C. C. Gibbs, General Freight Agent; T. W. Pierce, Jr., General Passenger Agent.

*State Line & Sullivan.*—I. O. Blight is General Manager of this road, with office at Towanda, Pa.

*Turtle Creek Valley.*—At the annual meeting in Pittsburgh, March 2, the following officers were chosen: President, J. H. Connor; directors, Adolph Everhardt, J. S. Ferguson, James Herron, G. F. McLain, W. L. Stewart, W. J. Wilson. Mr. W. J. Wilson, of Sharpsburg, Pa., is Chief Engineer.

*Utah Central.*—John H. Rumel, Jr., is now Car Accountant for this company, in place of James Sharp.

*West Jersey.*—At the annual meeting in Camden, N. J., March 3, the following directors were chosen: George B. Roberts, Lewis Mulford, Coleman F. Leaming, Charles E. Elmer, John M. Moore, Thomas H. Dudley, George Wood, J. N. DuBarry, N. Parker Shortridge, Edmund Smith, Henry D. Welsh, William J. Sewell, B. F. Lee. This board elected George B. Roberts President; William J. Sewell, Vice-President; William Taylor, Secretary and Treasurer.

The leased lines elected officers as follows: *Ocean City.*—President, George Wood; Secretary and Treasurer, Wm. Taylor. *West Jersey & Atlantic.*—President, George Wood; Vice-President, Wm. J. Sewell; Secretary, H. C. Fries; Treasurer, Wm. Taylor. *Woodstown & Swedesboro.*—President, Wm. J. Sewell; Secretary and Treasurer, Wm. Taylor.

## PERSONAL.

—Mr. A. W. Leitnaker has resigned his position as Chief Train Dispatcher of the Chicago & Eastern Illinois road.

—Mr. Frederick Lovejoy has resigned his position as President of the Denver & Rio Grande Co., dating from Feb. 28.

—Mr. H. R. Johnston has resigned his position as General Freight Agent of the Cincinnati, Van Wert & Michigan road.

—Mr. A. S. Dunham has resigned his position as Secretary and Auditor of the Chicago & Western Indiana Co., and will, it is said, go to a Southern road.

—Mr. W. I. Brokaw has resigned his position as Master Mechanic of the Little Rock, Mississippi River & Texas road, to accept a position on the Wabash road.

—Mr. G. F. Ward, Assistant Superintendent and Purchasing Agent of the New York, Providence & Boston road, died in Saybrook, Conn., Feb. 28, after a long illness.

—It is reported that Mr. J. D. Carson will shortly resign his position as General Manager of the Chicago & Western Indiana road, and that he will accept a position on a Southern line.

—Mr. A. H. Brown has resigned his position as General Baggage Agent of the Fitchburg road and Station-master in Boston for that road.

—Mr. J. Davis Barnett, Port Hope, Can., member of the Institute of Mechanical Engineers and Acting President of the Master Mechanics' Association, was on Feb. 3 elected an associate member of the Institute of Civil Engineers, London.

—Mr. W. S. Polhemus has resigned his position as Superintendent of the Lehigh & Susquehanna Division of the Philadelphia & Reading road. He has been connected with the road for a long time, and his departure is much regretted.

—Mr. Deming N. Welch, who was General Superintendent of Pullman's Palace Car Co. from 1872 to 1880, died in Dresden, Germany, Feb. 11. Since his resignation he has been in very poor health, and went to Germany some time ago in hope of some improvement.

—Mr. David Upton, for many years a prominent citizen and business man of Rochester, N. Y., died in that city Feb. 12. Mr. Upton was for 20 years, from 1850 to 1870, Master Mechanic of the Western Division of the New York Central & Hudson River Railroad. Since 1870 he has been engaged in other business.

—Mr. Thomas N. Egery died in Bangor, Me., Feb. 26, aged 75 years. He was President of the Hinckley & Egery Iron Works and a prominent business man. For a number of years he was a director of the Bangor & Piscataquis Co., and he was a director and large owner of the Green Mountain Railroad on Mt. Desert.

—Mr. Orestes Quintard, Secretary of the Board of Trustees of the Brooklyn Bridge from its first organization, died in Brooklyn, N. Y., March 2, aged 67 years. Mr. Quintard was for many years bookkeeper for the contracting firm of Kingsley & Keeney, and when the Board of Trustees was first organized was made Secretary and has held the position ever since.

—Mr. J. Q. A. Bean died suddenly in Boston, March 1. He was born in Massachusetts, but some 35 years ago went West, and was for many years employed by the Michigan Central road. Subsequently he went to the Chicago, Burlington & Quincy, and for several years was General Freight Agent of that road. He resigned that position some years ago, desiring to return to the East on account of his health, and was shortly afterward appointed General Eastern Agent of the company, with office in Boston, and held that position at the time of his death.

—Mr. Isaac Burpee, of St. John, N. B., died March 1 in New York, where he came several months ago for medical treatment. Mr. Burpee was born in St. John in 1825, and when quite a young man established the hardware and iron firm of Burpee & Bros., which grew to be one of the largest business houses in the province. Mr. Burpee early took an interest in the building of the European & North American road in New Brunswick, which was afterward reorganized as the St. John & Maine. Later, in connection with Mr. George Stephen and D. A. McDonald, of Montreal, he bought the controlling interest in the New Brunswick Railway, and contributed largely to the extensions and leases by which that company now controls nearly all the railroad lines in New Brunswick outside the Intercolonial. He took a great interest in politics, and for 13 years past has served in the Dominion Parliament, and for some years was a member of the Cabinet.

—Mr. John Tucker, at one time President of the Philadelphia & Reading Railroad Co., died in Philadelphia, March 2, aged 81 years. Mr. Tucker was born in Milton, Mass., in 1813, and was for many years connected with John Gihon & Co., importers of linens in New York. Through the instrumentality of the firm, which had large interests in Reading Railroad affairs, he was elected in 1844 to the presidency of the company. He was continued in the office until 1854, when R. D. Cullen succeeded him. For a score of years Mr. Tucker exercised great influence in the company's affairs, being an official adviser to Asa Whitney and Charles E. Smith, who were presidents from 1859 to 1869. At the instance of President Lincoln and Secretary of War Stanton he was, in 1861, appointed Assistant Secretary of War in connection with Thomas A. Scott, of the Pennsylvania Railroad, and Philip H. Watson, afterward of the Erie Railroad. Until the close of the war he gave valuable assistance in superintending the transportation of troops by rail or water, and was most closely identified with the Lincoln administration. During all this time he continued to give his personal attention to the affairs of the Reading Railroad. The engineers and firemen of that company struck in 1863, and the transportation of troops and supplies of coal were likely to be crippled; but Mr. Tucker brought a force of government engineers and firemen to this city, seized the road for the national authorities, and, resuming operations, broke the backbone of the strike. President Lincoln offered Mr. Tucker the Collectorship of Philadelphia, but he declined. During 1872 and 1873 he was President, and for four years afterward Receiver, of the Selma, Rome & Dalton Railroad, after which he retired from public life. His affliction was disease of the kidneys, complicated by erysipelas.

## TRAFFIC AND EARNINGS.

### Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

| | 1885. | 1884. | Inc. or Dec. | P.c. |
|---|---|---|---|---|
| *Two months ending Feb. 28:* | | | | |
| Chi., Mil. & St. P. | $2,864,000 | $2,784,157 | I. $79,843 | 2.8 |
| Chi. & Nor'west. | 2,908,800 | 2,939,800 | D. 31,000 | 1.1 |
| St. L. & San F.. | 618,300 | 649,700 | D. 31,400 | 4.8 |
| *Month of January:* | | | | |
| N. Y. & N. Eng... | $230,420 | $243,047 | D. $12,627 | 5.2 |
| Net earnings... | 49,792 | 16,929 | I. 32,863 | 193.4 |
| N. Y., L. Erie & Western..... | 1,315,443 | 1,567,211 | D. 251,768 | 16.1 |
| Net earnings... | 170,638 | 85,773 | I. 84,865 | 98.9 |
| Phila. & Reading. | 1,846,366 | 2,195,800 | D. 349,434 | 15.9 |
| Net earnings... | 603,400 | 759,133 | D. 155,733 | 20.5 |
| West Jersey..... | 70,120 | 69,300 | I. 820 | 1.2 |
| Net earnings... | 18,658 | 24,900 | D. 6,242 | 25.1 |
| *Month of February:* | | | | |
| Chi., Mil. & St. P. | $1,346,000 | $1,317,064 | I. $28,936 | 2.2 |
| Chi. & Nor'west. | 1,237,500 | 1,437,500 | D. 200,000 | 13.9 |
| St. L. & San Fran. | 302,400 | 329,700 | D. 27,300 | 8.3 |
| *Third week in February:* | | | | |
| Chi. & Alton .. | $136,413 | $161,316 | D. $24,902 | 15.5 |
| Chi. & East. Ill.. | 16,051 | 24,334 | D. 8,283 | 34.0 |
| Cin., Ind., St. L. & Chi..... | 37,809 | 30,671 | I. 7,138 | 23.2 |
| Louisv. & Nash. | 265,895 | 207,060 | I. 58,835 | 28.4 |
| St. P. & Duluth.. | 13,832 | 13,738 | I. 94 | 0.7 |

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

### California Through Freights.

Shipments of through freight eastward from California points by rail last year were:

| | 1884. Tons. | 1884. Per cent. | 1883. Tons. | 1883. Per cent. |
|---|---|---|---|---|
| Central Pacific... ..... | 86,887 | 60.6 | 79,047 | 54.7 |
| Southern Pacific.. .... | 56,426 | 39.4 | 65,430 | 45.3 |
| Total.... ..... ...143,313 | | 100.0 | 144,477 | 100.0 |

Of the shipments last year 100,141 tons were from San Francisco and 43,172 tons from interior points. Leading articles of freight were 28,406 tons sugar, 12,293 tons wool, 9,773 tons tea and 9,008 tons wine.

### Coal.

Coal tonnages for the week ending Feb. 21 are reported as follows:

| | 1885. | 1884. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Anthracite..... | 329,634 | 417,719 | D. 88,085 | 21.1 |
| Eastern bituminous..... | 143,695 | 147,319 | D. 3,624 | 2.5 |
| Coke..... ..... | 48,774 | 60,220 | D. 11,446 | 19.0 |

A sharp competition is reported in bituminous coal, and it is reported that some of the large railroad contracts have been taken at figures slightly below the prices fixed by the pool for tidewater coal. The Grand Trunk contracts for over 400,000 tons will be let March 16, and there will probably be the usual fight over them.

The coal tonnage of the Pennsylvania Railroad for the week ending Feb. 21 was:

| | Coal. | Coke. | Total. | 1884. |
|---|---|---|---|---|
| Line of road . ..... | 124,119 | 46,394 | 170 513 | 180,409 |
| From other lines..... | 55,223 | 2,380 | 57,603 | 56,468 |
| Total..... | 179,342 | 48,774 | 228,116 | 236,877 |
| Year to Feb. 21.... ... | 1,342,483 | 321,628 | 1,664,111 | 1,825,118 |

Decrease for the week, 8,761 tons, or 3.7 per cent.; for the year, 161,007 tons, or 8.8 per cent.

The output of the anthracite companies controlled by the Pennsylvania Railroad Co. for the year ending Dec. 31, was:

| | 1884. | 1883. | Inc. or Dec. | P.c |
|---|---|---|---|---|
| Lykens Valley..... | 185,923 | 178,316 | I. 7,607 | 4.3 |
| Mineral R. R & Mining Co. | 401,892 | 419 825 | D. 17,933 | 4.3 |
| Summit Branch ..... | 364,545 | 339,942 | I. 24,603 | 7.2 |
| Susquehanna Coal Co..... | 1,299,324 | 1,119,321 | I. 180,003 | 16.1 |
| Total..... .. ... | 2,251,684 | 2,057,404 | I. 194,280 | 9.4 |

The average working time last year was: Summit Branch, 305 days; Lykens Valley and Susquehanna Coal Co., 294; Mineral Railroad & Mining Co., 205 days. Consumption at mines is not included above.

The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the two months to Feb. 28 was:

| | 1885. | 1884. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| S. Amboy for shipment... . | 68,546 | 84,627 | D. 16,081 | 14.9 |
| Local points on N. J. divs... | 122,016 | 134,137 | D. 12,121 | 9 0 |
| Co.'s use " " ... | 36,532 | 31,286 | I. 5,246 | 16.9 |
| Total. ... ..... ..... | 227,094 | 250,050 | D. 22,956 | 9.2 |

Of the total this year 181,582 tons were from the Lehigh Region and 45,512 tons from the Wyoming Region.

Cumberland coal shipments for the two months ending Feb. 28 are reported by the Cumberland *Civilian* as follows:

| | 1885. | 1884. | Inc. or Dec. | P.c. |
|---|---|---|---|---|
| Balto. & Ohio R.R.....243,865 | | 225,635 | I. 18,230 | 8.1 |
| Pennsylvania R.R..... | 24,368 | 38,680 | D. 14,312 | 36.7 |
| Total ..... ..... | 268,233 | 264,315 | I. 3,918 | 1.5 |

No shipments have yet been made by canal. Shipments from mines were: Cumberland & Pennsylvania, 189,920; George's Creek & Cumberland, 20,264; West Virginia Central & Pittsburgh, 61,379; total, 271,563 tons.

Actual tonnage passing over the Huntingdon & Broad Top road for the two months to Feb. 28 was:

| | 1885. | 1884. | Decrease. | P.c. |
|---|---|---|---|---|
| Broad Top coal..... | 24,084 | 30.986 | 6,902 | 22.3 |
| Cumberland coal..... | 27,780 | 41,337 | 13,557 | 33.1 |
| Total. ..... ..... | 51,864 | 72,323 | 20,459 | 28 4 |

The Broad Top coal is mined on the line; the Cumberland is carried from Mt. Dallas to Huntingdon for the Pennsylvania Railroad.

The coal tonnage of the Pennsylvania Railroad Division, Pennsylvania Railroad, for the two months to Feb. 28 was:

| | 1885. | 1884. | Decrease. | P.c. |
|---|---|---|---|---|
| Coal..... ....1,555,560 | | 1,564,203 | 8,643 | 0.6 |
| Coke..... | 370,076 | 492,974 | 122,898 | 24.9 |
| Total ..... ..1,925,636 | | 2,057,177 | 131.541 | 6.4 |

This includes all tonnage, both that mined on the line and that received from other roads.

### Cotton.

Cotton movement for the six months of the crop year from Sept. 1 to Feb. 27 is reported by the *Commercial and Financial Chronicle* as follows, in bales:

| *Interior markets:* | 1884-85. | 1883-84. | Inc. or Dec. | P.c |
|---|---|---|---|---|
| Receipts ..... | 2,419,820 | 2 512.355 | D. 92.535 | 3.7 |
| Shipments ..... | 2,220.553 | 2,334,246 | D 113,693 | 4.9 |
| Stock, Feb. 27. .. .. | 216,482 | 227,265 | D. 10,783 | 4.7 |
| *Seaports:* | | | | |
| Receipts. ..... ..... | 4.390,034 | 4.340,218 | I. 49.816 | 1.1 |
| Exports..... | 3,121.423 | 2,943.907 | I. 177,516 | 6 0 |
| Stock, Feb. 27..... | 802,225 | 948,594 | D. 146,369 | 15.4 |

It should be remembered that a considerable part of the shipments from interior markets appears again in the receipts at the seaports.

The *Chronicle* says: "In the table below we give the receipts from plantations and add to them the net overland movement to Feb. 1, and also the takings by Southern spinners to the same date, so as to give substantially the amount of cotton now in sight:

| | 1884-85. | 1883-84. | 1882-83. | 1881-82. |
|---|---|---|---|---|
| Receipts at the ports to Feb. 27.... ... ...4,390,034 | | 4,340,218 | 4,901,714 | 4,058,488 |
| Interior stocks on Feb. 27 in excess of Sept 1. | 199,267 | 178,109 | 291,932 | 297,647 |
| Total receipts from plantations... .....4,589,301 | | 4.518,327 | 5,193,646 | 4,356,135 |
| Net overland to Feb. 1. | 442.478 | 444,671 | 472,320 | 337,278 |
| Southern consumption to Feb. 1 ..... .. | 144.000 | 150,000 | 160,000 | 125,000 |
| Total in sight, Feb. 27..... ... .....5,175,779 | | 5,112,998 | 5 825,966 | 4,818,413 |
| Northern spinners' takings to Feb. 27...1,009,573 | | 1,105,735 | 1,248,166 | 1,207,462 |

"It will be seen by the above that the increase in amount in sight to-night, as compared with last year, is 62,781 bales, the decrease from 1882-83 is 650,187 bales, and the increase over 1881-82 is 357,366 bales.

"The continued wintry weather at the South is delaying the marketing of the remnant of the crop and preventing all preparations for the new planting. Snow and sleet are reported in a few sections this week, and low temperature is universal."

### Transcontinental Association.

The Executive Committee of this association held a meeting in Chicago Feb. 27, at which it was resolved to continue the association until April 30 pending further arrangements It was agreed to make Chicago and St. Louis the starting points for all through rates instead of New York, as heretofore, although through rates from New York to Pacific coast points will still be given.

On the following day the meeting of the committee continued, the principal point under discussion being the selection of a Commissioner. No choice was made, but Mr. L. G. Carman was continued as Acting Commissioner. The Board of Arbitrators was finally completed by the selection of Messrs. George M. Bogue, E. A. Ford and D. S. Gray, who have all signified their willingness to serve.

### Manitoba Immigrant Rates.

The lines interested in the passenger business from Eastern Canada to Manitoba and the Northwest have agreed upon emigrant rates based on a rate of $20 from Montreal to Winnebago. This rate is to take effect March 1, and a commission of 10 per cent. may be allowed to selling agents.

### Passenger Rates.

The only change in the east-bound passenger rates reported during the week is a reduction of the rates from St. Louis to New York and Philadelphia to $12, and to Washington, $10.50. This reduction was made by the Vandalia Line, and generally followed by the other roads.

### Passenger Notes.

A new line between Detroit and Toledo has been opened by the Toledo, Ann Arbor & North Michigan road from Toledo to Milan, and the Wabash, St. Louis & Pacific from that place to Detroit. Through trains will be run between the two cities on that line. Arrangements have also been made for through sleeping cars between Pittsburgh and Detroit by the Pennsylvania Co.'s line from Pittsburgh to Toledo, and the new route from Toledo to Detroit.

### Commercial Mileage Tickets.

Messrs. A. V. H. Carpenter, of the St. Paul; P. Lowell, of the Burlington, and W. A. Thrall, of the Northwestern road, met at the office of the Chicago Freight Bureau yesterday in conference with a committee representing the merchants of this city, to consider the adoption of a 1,000-mile commercial ticket that would protect the railroads from imposition and not conflict with the demands of the merchants. The new form of ticket, known as the Thrall ticket, was adopted, as giving satisfaction to all concerned. This ticket will be sold for $30, with a rebate of 1 per cent. per mile. It will be sold only to the merchants themselves, to whom the rebate will be paid. This new form will be placed in the market on April 1. —*Chicago Inter-Ocean, Feb.* 28.

### California Wheat and Meat by Rail.

The Southern Pacific road expects to handle this year a large part of the California wheat crop, and special rates will be made on wheat from California to England, by way of New Orleans, with a view of securing the largest possible share of this traffic.

Recently a lot of fresh California mutton was shipped to Chicago on special rates, the object being to introduce this meat in the East, and other shipments will follow. This meat is sent by the Central Pacific line.

## RAILROAD LAW.

### Charter Exemption from Taxation.

In the case of the St. Louis, Iron Mountain & Southern Co. against the Railroad Commissioners of Arkansas, the company claimed exemption from taxation under the section of the original charter of the Cairo & Fulton Railroad Co. The United States Supreme Court has now decided that this exemption

conferred by the original charter did not pass by consolidation to the St. Louis, Iron Mountain & Southern Co., and therefore affirms the judgment of the Supreme Court of Arkansas. In this decision the Supreme Court has followed the line of its precedents in limiting in the strictest manner all grants of exemption from taxation.

**Car Trusts.**

Among car trust certificate holders there seems to be some misunderstanding as to the effect of the recent decision by Judge Hallett in the case of the Denver & Rio Grande Car Trust. Nothing is stated in that opinion which gives countenance to the notion that the car trust has in any sense a prior claim over a prior bond either upon the earnings generally or upon the mortgaged property. All that Judge Hallett decided was that the contract was valid as against the bondholders, who claimed that it was in effect a chattel mortgage and void because it had not been recorded according to the laws of Colorado. In case of foreclosure under a prior mortgage the holders of the car trust certificates would, of course, have no claim upon the proceeds of the mortgaged property till after the bondholders had first been satisfied—as their security is confined to the cars themselves; but, on the other hand, if necessary for the operation of the road, a Receiver cannot retain possession of the rolling stock without paying the rent. And this is what Judge Hallett decided, and no more. The same principle has been applied in other cases. In the New York & New England Car Trust the Receiver, not having use for the cars, refused to pay the rental, and negotiations are now pending for a settlement; while in the Reading Railroad Car Trust the evidence showed that the cars were earning more than the rental; and the Court ordered it paid. That this was the view of Judge Hallett in Colorado will be apparent from his own language. In the course of his opinion he says:

"If the road had not been supplied with rolling stock when the Receiver took possession it would have been necessary to purchase enough to carry on the business of the road, and the Receiver would have paid for it from current earnings available for that purpose. That he now pays for the rolling stock under contracts made by the railway company previous to his appointment does not present the question in any other light. He is only buying rolling stock for the use of the road and which is said to be necessary to carry on its business, according to the usual course of proceeding in cases of this kind. In order to keep the road in operation the Receiver must have rolling stock, and he ought not to take in behalf of bondholders or any one without paying for it. Every payment made under these contracts increases the interest of the railway company in the rolling stock, and adds to the value of plaintiff's mortgage security. Payments are made in the interest of bondholders as well as the railway company, and I see no grounds for complaint for them, unless it may be that the price of the cars is too high or that some of them are not necessary to the business of the road. If anything is to be gained by rescinding any of the contracts and surrendering the cars to the payees, action may be had on proper showing, but the Court is not now advised in respect to that matter. In some cases, where rolling stock was held under contracts of purchase, the Receiver has paid for the use of it and returned it to the seller at the close of the receivership. That course was probably regarded as promoting the best interests of all concerned. Whenever considerable payments have been made under the contracts, and the interest of the railway company in the rolling stock acquired by such payments appears to be large, the advantage of continuing the payments under the receivership will be apparent."—*Philadelphia Ledger, March 2.*

## OLD AND NEW ROADS.

**Addison & Northern Pennsylvania.**—This road is now in operation to Galeton (formerly Pike Mills), Pa., 5 miles beyond the late terminus at Gaines, and 46 miles from the northern terminus at Addison, N. Y. Track on the extension was laid last year.

**Algona, Bellemond & Northern.**—This company has been organized to build a railroad from Algona, Ia., northwest to a point on the Minnesota line. The headquarters of the company are at Kossuth, Iowa.

**Baltimore & Ohio.**—This company has negotiated the sale of $10,000,000 in new 5 per cent. bonds having 40 years to run. These bonds are issued by the Baltimore & Ohio Co., and are secured by a pledge of an equal amount of second consolidated bonds of the Pittsburgh & Connellsville Railroad, and also by stocks of the branch lines of the Pittsburgh Division, and on the terminal property in Pittsburgh. The new loan was negotiated through Hallgarten & Co., and the bonds are now offered in London and New York at 100½ and interest.

In a suit begun by the Baltimore & Ohio Co. and William Truby, Trustee, the Court has granted a decree of foreclosure against the Ohio & Baltimore Short Line and an order of sale of the property. The mortgage was for $500,000 and the bonds are held by the Baltimore & Ohio Co. The road is a short cut from Washington, Pa., to Connellsville, the construction of which was begun some 13 years ago, but afterward suspended. The Baltimore & Ohio Co. is now completing the road, and by this foreclosure and sale will obtain a complete title.

**Barton County.**—Surveys are being made for this road from Nevada, Mo., on the Missouri Pacific, southward to Minden, in the Barton County coal fields, a distance of 33 miles. Work will be begun as soon as possible, with the intention of completing the road this season. Messrs. F. P. Anderson and E. H. Brown, of Minden, are the parties chiefly interested in the road.

**Boston, Barre & Gardner.**—The Boston *Advertiser* of March 2 says: "A controlling interest in the Boston, Barre & Gardner Railroad has been secured by friends of the Fitchburg. The road runs from Worcester to Winchendon, 36.53 miles. Its capital stock is $875,277, and its funded debt, $632,600. Its earnings are a little more than the fixed charges. Of the 8,752 shares of stock, the city of Worcester owns more than 2,000, and other cities and towns more than 4,000. The Security Associates of Worcester held 1,500 shares, and recent purchases for them by Mr. W. H. Morse, President of the road, have given them and others friendly to the Fitchburg the control. This does not imply that the road is to be leased by the Fitchburg or be operated by it, though such may be the case; but, as the Fitchburg's leased line, the Vermont & Massachusetts, is crossed by the Boston, Barre & Gardner, and, as the latter connects with the Boston & Albany on the south and the Cheshire on the north, it is obvious that the Fitchburg might have been seriously damaged if the control had been secured by either of those companies."

A later dispatch says that the Fitchburg Co. will operate the road for one year under a temporary contract, until further arrangements can be made.

**Buffalo, New York & Philadelphia.**—The time for the subscription to the assessment plan for relieving this company from its difficulties expired March 1. The plan has not been successful, many stockholders having failed to subscribe. It is not yet decided whether the time will be extended and a further effort made to bring in stockholders, or whether a new plan will be proposed.

The changes which the Amsterdam bondholders desire to make in the plan for the adjustment of the companies' difficulties are as follows: An extension of the time for carrying out the provisions of the plan beyond the three years proposed; and also some representation of the subscribing stock before the time proposed in the present plan. If these conditions are accepted, the Amsterdam stockholders are willing to subscribe liberally.

**Cape Fear & Yadkin Valley.**—This road is now 155 miles long, from Bennettsville, S. C., through Fayetteville, N. C., to Greensboro. The extension from Greensboro to Mt. Airy, about 60 miles, is nearly all graded; most of the ties have been bought and contracts let for bridges, and it is expected that the work will be pushed vigorously.

**Central Massachusetts.**—A plan for the reorganization of this company has been submitted by the directors. It is proposed to change the name of the company to the Boston, Hudson & Western, and to assess the holders of preferred stock $5 and of common stock $20 per share to furnish a fund for the completion of the road. It is stated that two propositions have been received by the directors for the operation of the road when completed. The Boston & Lowell Co. will work the road for the earnings until they reach $600,000 yearly; when they exceed that sum it will pay 10 per cent. of the total as rent. The Fitchburg Co. offers either to work the road, paying a percentage of the gross earnings as rental, or it will purchase the road, giving one share of its own stock for 6 shares of Central Massachusetts preferred, nothing being said about the common stock.

**Chicago, Milwaukee & St. Paul.**—Several rumors have been in circulation as to the $3,000,000 new terminal bonds of this company, which were taken by Blake Bros. & Co. The facts are stated as follows: Of the entire loan $2,000,000 have been taken by Blake Bros., and those bonds have been sold and accounted for to the company. On the remaining $1,000,000 Blake Bros. have an option which they have not yet exercised; but on account of these bonds they have advanced $750,000 to the company, which, of course, will have to be repaid if the bonds are not taken.

**Clearfield & Jefferson.**—This company has been organized to build a railroad from the present terminus of the Bell's Gap road, at Irvona, in Clearfield County, Pa., westward 32 miles to Punxsutawney, in Jefferson County, where it will connect with the Rochester & Pittsburgh road.

**Columbia & Puget Sound.**—This company is about to begin work on a branch from its road near Cedar River, Wash. Ter., to the Black Diamond coal mines. The branch will be 2½ miles long.

**Connecticut Central.**—The towns which hold stock in this company have assigned their stock to Mr. Henry L. Goodwin, of East Hartford, constituting him their agent to defend the foreclosure suit brought by the bondholders.

**Dayton & Toledo.**—Under this name is now known the former Dayton Division of the Toledo, Cincinnati & St. Louis road, which was bought by the bondholders some months ago. It extends from Delphos, O., to Dayton, 96 miles.

**Delaware & Hudson Canal Co.**—The freight station of this company's Albany & Susquehanna Division, in Albany, N. Y., was burned down March 1. The building was of wood, 600 ft. long, and was well filled with freight. It was totally destroyed, together with 15 loaded cars, and a number of other cars were damaged. The loss to the company is estimated at about $50,000. The West Shore road also uses this station and loses on cars and freight nearly $50,000 more.

**Denver & Rio Grande Western.**—Considerable progress has been made with the improvements on this road, which were recommended by the bondholders' committee. The track has been raised at several points where there has been trouble with freshets, and the bridges along Price River are being replaced by new bridges of longer spans, most of them 64 ft., giving sufficient water-way for the river. These bridges are all being protected by piles driven to prevent the abutments from being washed out, and at a number of points where the road runs close to the river it is protected by piling or rip-rap. In several places the curves have been reduced, and work has been begun in cutting down some of the heavier grades. At Green River a large force is employed building piers for a new iron bridge, to replace the present pile bridge, which has been carried out two or three times. The new bridge will have 4 spans of 160 ft. each, resting on stone piers.

**East Tennessee, Virginia & Georgia.**—A suit is now in progress which involves the question of the lien of the consolidated mortgage of this road upon the Ohio Division, formerly the Knoxville & Ohio road. This road was sold to the East Tennessee Co. in 1881, having at that time outstanding $500,000 in bonds, and $35,000 in funded coupons. It was arranged that these bonds should be retired from the proceeds of the consolidated mortgage, but for some reason or other this was never done and the Knoxville & Ohio bonds finally came into the possession of the Metropolitan National Bank, of New York, along with other bonds as security for money advanced. Last July the United States Circuit Court decided that the sale of the Knoxville & Ohio road was not valid owing to the want of power in the company to transfer its road. The Court, however, held that the East Tennessee Co. was entitled to a lien upon the road for money which it had advanced to complete the road and to purchase the old bonds from the origiaal holders and ordered the sale of the road to satisfy this lien. Upon this decision the Metropolitan Bank intervened by petition, setting up its claim on the road through the bonds which it held as collateral security. At the same time it appeared that these bonds had been formally canceled at one time by the trustees and the mortgage discharged of record; but it does not appear why the bonds still remained in existence and how they had been transferred to the bank. The case seems to be a somewhat complicated one, and testimony is now being taken before a special master in New York.

**Fitchburg.**—The company will undertake the operation of the Boston, Barre & Gardner road for one year under a temporary contract. The road extends from Worcester, Mass., to Winchendon, 36½ miles, and a controlling interest in its stock has just been bought by parties largely interested in the Fitchburg road. It is intimated that during the year arrangements will be made for a consolidation or a permanent lease of the road.

**Florida Railway & Navigation Co.**—The Southern Division of this company's line is now completed to Withlacoochee, Fla., 15 miles southward from the late terminus at Panasoffkee, and 99 miles from the junction with the Central Division at Waldo. Work is progressing on the extension southward toward Tampa and Charlotte Harbor.

**Gainesville & Dahlonega.**—This road is now graded from Gainesville, Ga., westward to Leather Ford, 15 mile and track has been laid for 5 miles from Gainesville. Wor is to be continued by the company during the summer with a view of completing the road, which is to run from Gainesville westward to Cartersville, the terminus of the East & West Railroad, with a branch to Dahlonega.

**Galveston, Sabine & St. Louis.**—Arrangements have been completed for resuming work on this road and it is expected that the extension from its present terminus at Martin's Creek, Tex. (25 miles south of Longview), to a connection with the Houston, East & West Texas, at Wood's station, will be completed by April.

**Great Southern.**—This project for a short line to Florida, on which some work was done several years ago, has been revived, and the old charter had been secured by a syndicate headed by Mr. M. T. Dill. They are negotiating for the use of the short line from Jacksonville, Fla., to Hart's Road, which is owned by the Florida Railway & Navigation Co., and propose to build a railroad from Hart's Road to Jesup, Ga., and thence to Millen, where it will connect with the Central Railroad, of Georgia. The road, if built, will make very nearly an air line from Augusta, Ga., to Jacksonville, and will run, for the most part, through a very good lumber country, most of which is now remote from railroads.

**Indiana, Bloomington & Western.**—An Indianapolis dispatch reports that this company has decided to surrender the lease of the Indianapolis, Decatur & Springfield road and to turn over the road to the trustees for the bondholders. The reason for this action is that the operation of the road has been very unprofitable.

**Lackawanna & Pittsburgh.**—The employés of this road struck March 1, refusing to do any more work until they are paid the back wages due them. It is said that a good many of them have not been paid up since August, and they and their families are in much distress for their money. When a Receiver was appointed for the road, he was authorized to issue $100,000 in certificates for the purpose of paying off back wages due, but he has so far been unable to negotiate these certificates or to raise money upon them. Latest dispatches say that the men have been paid and the running of trains has been resumed.

**Long Island.**—This company's statement for the quarter ending Dec. 31 is as follows:

| | 1884. | 1883. | Inc. or Dec. | P.c. |
|---|---|---|---|---|
| Earnings | $567 644 | $551,841 | I. $15.803 | 2.9 |
| Expenses | 373,176 | 444,497 | D. 71,321 | 16.1 |
| Net earnings | $194,468 | $107,344 | I. $87,124 | 81.3 |
| Other income | 16,913 | 14,874 | I. 2,039 | 13.6 |
| Total | $211,381 | $122,218 | I. $89,163 | 73.1 |
| Interest, etc | 145,610 | 146,415 | I. 3,198 | 2.1 |
| Surplus or deficit | S. $61,771 | D. $24,194 | | |

The total gain for the quarter was thus $85,965. The dividend paid was 1 per cent., requiring $100,000. The quarter is usually one of light earnings on this road.

**Marquette, Houghton & Ontonagon.**—This company has bought the Marquette & Western road, which was built last year as an extension of the Detroit, Mackinac & Marquette road. It extends from Marquette, Mich., to Ishpeming, 17 miles, and has some 10 miles of branches and spurs to iron mines: there are also valuable ore docks at Marquette. The price paid is $1,400,000 in 6 per cent. bonds and $600,000 in common stock, so that the purchase will add $84,000 yearly ($3,111 per mile) to the fixed charges. The road bought forms practically a second track from Marquette to Ishpeming, but the main object is to do away with competition.

**Mexican Railroad Notes.**—The following notes are from the *Mexican Financier* of Feb. 21:

On the Tampico Branch of the Mexican Central the track had been laid, to kilometer 143 in January where it is to cross the Rio del Salto, and at that point track-laying was suspended in order to construct a wooden bridge of 93 meters of length across the stream. This will afterward be substituted by an iron bridge. At a distance of 200 meters from the bridge a water tank has been put up. At kilometer 140 the station of Villa de Valles is now completed, with a warehouse for storing freight, and telegraph office. The contract work in the Abra de Caballeros is expected to be finished this month.

During the month of December the average number of men at work on the grading of the Pacific Branch of the Mexican Central Railroad was 150, according to the report of the government inspector, Pablo Ocampo. The length of the road now in operation is a little more than 26 kilometers. In December, 47 passengers and 237 tons of freight were carried from San Blas to Huaristemba, and 40 passengers and 70 tons from Huaristemba to San Blas. Gross product of this traffic was $729 or $27 per kilometer against $32 per kilometer for November.

The official journal of the state of Durango states that its Governor during his recent stay in this city arranged for the construction of a railway to join the city of Durango to a convenient point on the Mexican Central. It goes on to say that the concession for construction is not only obtained, but that the Governor has obtained the important advantage that the general government shall guarantee the company 4 per cent. annually on the capital invested in construction. This would certainly be a very important advantage, but we are hardly prepared to believe that the government is giving such reckless promises as this statement would imply. It is to be hoped, however, that this branch of the Mexican Central will be built before long, as it is a necessity to commerce, and a city of the importance of Durango cannot afford to be left aside without any advantage of railroad connection, when it lies so near to a trunk line. But even this necessity does not warrant the class of concessions that the *Periódico Oficial* of Durango wishes us to believe has been granted. With an efficient management the company needs no such guarantee, and with a poor management it does not deserve it.

**Michigan Central.**—It is reported that this company will redeem the $1,277,000 Jackson, Lansing & Saginaw bonds, due July 1, from the proceeds of land sales. Interest charges will thereby be reduced $102,000 per year.

**Minnesota Railroad Commission.**—The Minnesota Legislature has passed an amended bill providing for the appointment of two commissioners as a board of Railroad and Warehouse Commissioners. They are to have the right to inquire into the affairs of the railroad companies and to have limited powers of regulation, and are also to have power to regulate elevators and grain warehouses. The powers, however, are much restricted from those proposed in the original bill.

**Missouri Pacific.**—In the Circuit Court in St. Louis, March 2, proceedings were begun in the name of the State of Missouri to enjoin the Missouri Pacific Co., Jay Gould and other officers of that company from voting on the stock held by them in the St. Louis, Iron Mountain & Southern Co., on the ground that under the law and constitution of Missouri it is unlawful for one company to own or control a parallel or competing line, and as the Missouri Pacific leases and operates the Missouri, Kansas & Texas, which is a parallel

and competing line to the Iron Mountain, the control of both lines by the same company is illegal. The total amount of stock in the Iron Mountain Co. is 220,735 shares, of which 220,000 shares are held by Jay Gould as trustee for the Missouri Pacific Co., and all the rest, except about 100 shares, are held by the officers of the company to qualify themselves as directors.

**New York, Chicago & St. Louis.**—This company's statement for the quarter ending Dec. 31 is as below:

| | 1884. | 1883. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Earnings | $865,549 | $854,434 | I. $11,115 | 1.3 |
| Expenses | 604,332 | 479,719 | I. 124,613 | 25.9 |
| Net earnings | $261,217 | $374,715 | D. $113,498 | 30 3 |
| Other income | 900 | 27,597 | D. 26,697 | 96.8 |
| Total | $262,117 | $402,312 | D. $140,195 | 34 9 |
| Fixed charges | 414,339 | 376,207 | I. 38,132 | 10.1 |
| Surplus or def | D.$152,222 | S.$26,105 | | |

The net change was thus from a surplus of $26,105 to a deficit of $152,222, a total decrease of $178,327 for the quarter.

**New York, Lake Erie & Western.**—This company's statement for January and the four months of the fiscal year from Oct. 1 to Jan. 31 is as follows, the figures including 68 per cent. of the gross earnings and all the expenses of the leased New York, Pennsylvania & Ohio road:

| | January. | | Four months. | |
|---|---|---|---|---|
| | 1885. | 1884. | 1884-85. | 1883-84. |
| Earnings | $1,315,343 | $1,567,211 | $6,457,024 | $7,982,907 |
| Expenses | 1,144,805 | 1,481,438 | 4,820,375 | 6,124,345 |
| Net earnings | $170,638 | $85,773 | $1,636,649 | $1,858,562 |

For the four months the gross earnings show a decrease of $1,525,883 (19.1 per cent.) and the expenses a decrease of $1,303,970 (21.3 per cent.), the net result being a decrease of $221,913, or 11.9 per cent.

The earnings of the Erie line proper, excluding all earnings or expenses of the New York, Pennsylvania & Ohio, for the same periods were:

| | January. | | Four months. | |
|---|---|---|---|---|
| | 1885. | 1884. | 1884-85. | 1883-84. |
| Earnings | $1,050,474 | $1,272,331 | $5,195,871 | $6,494,896 |
| Expenses | 863,347 | 1,098,257 | 3,642,831 | 4,547,838 |
| Net earn | $187.127 | $174,074 | $1,553,040 | $1,947,058 |
| Per c. of exps. | 82.2 | 86.3 | 70.1 | 70.0 |

For the four months the decrease in gross earnings was $1,299,025 (20.0 per cent.), and in expenses $905,007 (19.9 per cent.), leaving a decrease of $394,018 (20.2 per cent.) in net earnings.

A comparison of the two statements shows that for the four months the 68 per cent. of the gross earnings of the leased road amounted to $1,261,153, and its working expenses to $1,177,544, leaving a profit of $83,609 so far this year, against a loss of $88,496 for the corresponding period last year. In January the loss was $16,489 this year and $88,301 last year.

**New York & New England.**—The gross and net earnings for the fiscal years 1883-84 and 1884-85 by months are as follows:

| | Gross earnings | | Net earnings. | |
|---|---|---|---|---|
| | 1884-85. | 1883-84. | 1884-85. | 1883-84. |
| October | $306,992 | $365,877 | $105,968 | $105,422 |
| November | 254,420 | 310,092 | 68,303 | 42,183 |
| December | 239,049 | 245,421 | 51.019 | *115,180 |
| January | 230,420 | 243,046 | 49,792 | *29,106 |
| Total | $1,030,881 | $1,134 436 | $275,082 | $3,319 |

* Deficit.

The Receiver's statement says: "In January, 1884, there was a deficit of $29,106, and although the net earnings in January, 1885, were $49,792 (an increase of $78,898), they are only about one-half of the fixed charges for the month."

**Northern Central.**—This company will soon begin construction of a new union station at Charles street, in Baltimore. The building will be 200 by 50 ft., of brick. The first floor, which will be on the level of the track, but below the level of the street, will contain waiting rooms and ticket office, and the second floor will have restaurant and smoking-room. The new station has been much needed, as a great deal of business is done at the Charles street junction, and station accommodations there have been insufficient.

**Ogdensburg & Lake Champlain.**—This company's statement for the quarter ending Dec. 31 is as follows:

| | |
|---|---|
| Earnings | $151,934 |
| Expenses | 77,560 |
| Net earnings | $74,374 |
| Other income | 2,410 |
| Total | $76,784 |
| Fixed charges | 52,670 |
| Surplus | $24,114 |

No statement was made for the quarter last year, so that no comparison can be made.

**Ohio Central.**—Suit has been begun by John Stanton, a bondholder, against this company, George I. Seney, Samuel Shethar and the Metropolitan National Bank, asking for an accounting in relation to the $5,000,000 subscribed to build the River Division. The complaint charges that this money has never been properly accounted for, and that part of it was diverted from the purposes for which it was raised.

**Oregon Railway & Navigation Co.**—The directors of this company are not at all disposed to accept the Northern Pacific proposition for a lease of the road at 5 per cent. dividend for three years, and 6 per cent. thereafter. They have not as yet named any terms, but it is understood that they would be willing to accept 6 per cent. for three years and 7 per cent. thereafter, believing that the property can earn that amount in any event. Further negotiations are possible, but it will probably take some time to reach an agreement, if indeed any can be reached.

**Pennsylvania.**—Contracts have been let for the passenger station of the Schuylkill Division in Reading, Pa. It will be located on Penn street in that city, and the main building will be 54 by 112 ft. in size, built of brick with blue stone trimmings. The covered platform adjoining the track will be 295 ft. long. The station will be very ornamental in appearance and will be furnished with all possible conveniences for passengers.

**Philadelphia & Reading.**—At a meeting of bondholders in Philadelphia, March 2, the Bartol Committee presented its report. The report stated that with a desire for harmony with the board of managers of the company, the Committee had made all the concessions which were possible without sacrificing the interest of the general mortgage bondholders. In spite of this the negotiation did not prove successful. The report sets forth at some length the reasons why, in the Committee's opinion, the plan of reorganization does not meet the necessary conditions. Resolutions were presented and adopted, after some discussion, to the effect that the bondholders represented at the meeting would refuse to join in the plan of reorganization proposed by the board of managers unless modified, and that the committee of five be continued to prepare a plan that will protect the interest of all concerned. The Committee was also instructed to resist all payments by the Receiver which in their judgment are unjust to the interest of the general mortgage bondholders.

The board of managers has issued a long document as an answer to the report of the Bartol Committee. The document is a very long one, and refers to that committee and the bondholders represented by it as mischief-makers who seek to prevent the reorganization of the company without clearly stating what they want. It is charged that the Committee represents less than $3,000,000 out of the $25,000,000 general mortgage bonds, and that their real object is to secure a foreclosure, breaking up the property of the company.

The Philadelphia *Ledger* very sensibly says: "The affairs of the unfortunate Reading Railroad have extended beyond the domain of finance into both law and literature. The courts generously permit it to occupy much of their time, and the newspapers gratuitously give it a large portion of their space. For a long period past we have surrendered to all parties concerned in Reading's adjustment much valuable space in this journal, and the result has been to develop their controversial abilities possibly to an abnormal degree, in order that no one might question our spirit of fairness. Yet all the time Reading itself has been done no good, and its finances have grown steadily worse. The time that ought to be devoted to caring for the road seems now to be largely occupied in preparing ponderous documents for publication; and almost every one concerned seems to care more for controversy than for railroad management. The public are weary of this wordy strife, which has become burdensome to all concerned. We know of no more promising contribution that the press of this city can make toward a Reading statement than to stop printing Reading controversial documents. If the combatants in the literary arena are thus deprived of an audience, it is probable they will cease disputing and do something toward securing an effective settlement."

The Receivers' statement gives the following figures for January and the two months of the fiscal year from Dec. 1 to Jan 31 for the earnings of the railroad:

| | January. | | Two months. | |
|---|---|---|---|---|
| | 1885. | 1884. | 1884-85. | 1883-84. |
| Earnings | $1,846,366 | $2,195,800 | $4,161,929 | $4,493,443 |
| Expenses | 1,242,965 | 1,436,667 | 2,637,517 | 2,848,753 |
| Net earnings | $603,401 | $759,133 | $1,524,412 | $1,644 690 |

For the two months there was thus a decrease of $331,514 (7.4 per cent.) in gross earnings, and of $120,278 (7.3 per cent.) in net earnings.

The traffic of the road is reported as follows:

| | January. | | Two months. | |
|---|---|---|---|---|
| | 1885. | 1884. | 1884-85. | 1883-84. |
| Passengers carried | 1,751,573 | 1,809.498 | 3.494,604 | 3,649,849 |
| Tons merchandise | 564,139 | 623.806 | 1,125,648 | 1.283,480 |
| Tons coal | 669,637 | 731.714 | 1,6?8,683 | 1,551,974 |
| Tons coal on colliers | 41,596 | 37,248 | 83,879 | 83,879 |

January thus showed a decrease in all classes of traffic. For the two months there was a small increase in coal, but a decrease in general freight and in passengers.

The earnings of the Philadelphia & Reading Coal & Iron Co. were:

| | January. | | Two months. | |
|---|---|---|---|---|
| | 1885 | 1884 | 1884-85. | 1883-84. |
| Earnings | $844.789 | $979,619 | $1,919,611 | $2,089,475 |
| Expenses | 905,634 | 1,070.686 | 2,030,010 | 2,287,252 |
| Deficit | $60,845 | $91,667 | $110,399 | $197,777 |

The earnings for the two months thus show a decrease of $169,864 (8.1 per cent.), but the expenses decreased also $257,242 (11.2 per cent.), the result being a decrease of the deficit by $87,378, or 44.1 per cent.

The coal mined from the company's lands was:

| | January. | | Two months. | |
|---|---|---|---|---|
| | 1885. | 1884. | 1884-85. | 1883-84. |
| By Coal & Iron Co | 246,290 | 269,333 | 621,018 | 556,052 |
| By tenants | 40,980 | 53,750 | 99,718 | 142,408 |
| Total | 287,270 | 323,083 | 720,736 | 699,460 |

The total tonnage mined for January shows a decrease of 35,813 tons, or 11.1 per cent.; for the two months, an increase of 22,276 tons, or 3.2 per cent.

The net earnings of both companies together compare as follows:

| | January. | | Two months. | |
|---|---|---|---|---|
| | 1885. | 1884. | 1884-85. | 1883-84 |
| R. R. Co. net earn | $603.401 | $759.133 | $1,524.412 | $1,644.690 |
| Coal & Iron Co. deficit. | 60.845 | 91,667 | 110,399 | 197.777 |
| Total net | $542,556 | $667,466 | $1,414,013 | $1,446,913 |

The decrease for the month in the total for both companies was $124,910, or 18.7 per cent.; for the two months, $32,900, or 2.3 per cent. As the expenses given above do not include anything for interest or rentals, the net earnings given above are the sums from which all fixed charges are to be provided.

**Pittsburgh, Chartiers & Youghiogheny.**—This road is now in operation from Mansfield, Pa., to Beechmont, 8 miles, an extension of 5 miles, from Junction No. 2 to Beechmont, having recently been completed. A branch from Junction No. 2 to Essen, 9 miles, is also in operation.

**St. Louis & San Francisco.**—The differences between this company and the War Department at Washington, in reference to the location of the bridge over the Arkansas River at Van Buren, Ark., have been adjusted and work on the construction of the bridge will be begun at once with the intention of completing it by November next. The bridge will be substantially on the location first selected by the company's engineers. It will have three fixed spans of 256 ft. each, four fixed spans of 165 ft. each, and one draw-span 370 ft. long, the total being 1,798 ft. Contracts have been let both for the piers and the superstructure, the Union Bridge Co. being general contractor.

The company is filling up the big trestle at Avoca, Ark. An iron bridge of three spans will supply water-way, and the filling of the rest of the trestle will require about 150,000 cubic yards of earth.

**San Joaquin & Sierra Nevada.**—The grading and bridging on the extension of this road from the present terminus at Burson, Cal., westward to Valley Springs, about 15 miles, is completed, and track-laying has been begun. The ties and most of the iron are on hand.

**Southern Pacific.**—The final consolidation of the Southern Pacific with its controlled lines and extensions east of El Paso under one operating management was completed at a meeting held in New Orleans last week. This consolidation has been talked of some time, but its completion has probably been delayed until the payments for the Morgan road, which forms an important part of the system, were completed. The official order announcing the change is as follows, and is dated San Francisco, Feb. 27:

"Arrangements having been effected by the various railway companies interested between San Francisco and New Orleans, comprising the following roads, namely: The Southern Pacific of California, Southern Pacific of Arizona, Southern Pacific of New Mexico, Galveston, Harrisburg, & San Antonio, Louisiana Western, Texas & New Orleans, and Morgan's Louisiana & Texas Railway & Steamship lines, and roads controlled by the said companies, for a unification of their joint administration, and with a view to a more economical working of the properties, it has been decided that on and after March 1, 1885, these properties will be operated under one general organization, known as the Southern Pacific Co., with headquarters at San Francisco, Cal., divided into two sections; all west of El Paso will be known as the Pacific system, and all east thereof as the Atlantic system.

"The organization for the administration of the general conduct of the business of the company will be, briefly, as follows:

"Under the direction of the President, the general managers will attend generally to the business of the company, having the supervision and direction of all the departments of the service of the company within their respective jurisdictions, the financial and accounting departments excepted, and their orders will be obeyed and respected accordingly.

"The Secretary and Comptroller will have charge of all books and accounts, and will, subject to confirmation by the President, nominate and fix the compensation of suitable persons for the heads of the various offices of the accounting department.

"The Treasurer will have charge of all revenues of the company and will appoint, subject to confirmation by the President, such assistants as may be necessary for the conduct of the business.

"The General Traffic Manager, under the direction of the General Manager of the Pacific system, will be charged with the handling of all through business of the company and that interchanged by, or which may be competitive as between, the Pacific and Atlantic systems.

"Officials of the line: A. N. Towne, General Manager Pacific System, San Francisco, Cal.; A. C. Hutchinson, General Manager Atlantic System, New Orleans, La.; J. C. Stubbs, General Traffic Manager, San Francisco, Cal.

"All other officers and agents will be continued on the various roads and divisions as under the previous organization until further notice by the general managers."

**South Pennsylvania.**—The *Engineering News* gives the following statement as to the condition of the tunnels on this road on Feb. 1: "Blue Mountain, total length, 4,240 ft.; open, 1,610 ft. Kittatinny, total, 4,620 ft.; 2,280 ft. open. Tuscarora, total, 5,225 ft.; 1,967 ft. open. Sideling Hill, total, 6,662 ft.; 1,632 ft. open. Ray's Hill, total, 3,534 ft.; 1,234 ft. open. Allegheny Mountain, total, 5,900 ft.; 2,230 ft. open. Laurel Hill, total, 5,400 ft.; 990 ft. open. Quemahoning, total, 800 ft.; no progress reported.

"We understand that the late extremely cold weather has brought work on several of the tunnels practically to a standstill by freezing up all the watercourses on the mountain sides, and thus cutting off the supply required to work the compressors."

As the completion of this road depends upon the completion of the tunnels, and as no great increase in the speed of the work is possible in them, it will be seen that there is no probability, even if the work should be pushed as fast as possible, of the completion of the road during the present year, and, indeed, its opening can hardly be looked for before the latter part of 1886, even should work be continued and the current reports of stoppage prove incorrect.

**Texas & Pacific.**—The workmen in the repair shops at Marshall, Tex., have refused to accept the reduction in wages ordered by the company. Committees have been appointed to confer with the men in the other shops, and it is thought that the strike may extend to the Missouri Pacific.

**Texas & St. Louis.**—The Receiver's statement for January shows total receipts for that month of $193,801. The disbursements on all accounts amounted to $108,486, leaving a cash balance of $85,315 Feb. 1. The payments due on pay rolls and operating accounts at the close of the month were $42,677, which are to be paid from this cash balance.

**Tonawanda Valley & Cuba.**—The strike of the trainmen on this road still continues, and no trains are run. The Receiver recently endeavored to get an order from the Court authorizing him to pay the arrears of wages, but the order was refused, and the attempt to hire new hands in place of the strikers has been unsuccessful.

**Turtle Creek Valley.**—A Pittsburgh dispatch says that this project has been taken up by New York and Pittsburgh capitalists, who will make arrangements to build the road. The proposed line is from Pittsburgh northward to Turtle Creek, Pa., a distance of 83 miles. The road will open up considerable mineral territory, and will connect with the Rochester & Pittsburgh road, giving that road a direct line with Pittsburgh.

**Wabash, St. Louis & Pacific.**—The workmen in the repair shops of this road have generally resolved not to accept the reduction of wages proposed by the Receivers, and a general strike in all the shops on the line is expected.

In the United States Circuit Court, in Chicago, Feb. 28, a bill was filed by the trustees to foreclose the mortgage of $4,500,000 on the Toledo, Peoria & Western road, which has been for some years a part of the Wabash system. These bonds were issued in 1880, when the old Toledo, Peoria & Warsaw Co. was reorganized, and were assumed by the Wabash Co. Default has been made on three quarterly coupons, and the trustees have been requested to foreclose by a majority of the bondholders. The petition asks for the appointment of a separate Receiver for the Toledo, Peoria & Western road.

**Waco & Brazos Valley.**—A company is to be organized to build a railroad from Waco, Tex., down the eastern bank of the Brazos River, about 30 miles. A further extension of the road is proposed, but about 30 miles is all which it is intended to build at present.

**West Jersey.**—This company's statement for January, the first month of its fiscal year, is as follows:

| | 1885. | 1884. | Inc. or Dec. | P. c. |
|---|---|---|---|---|
| Earnings | $79,120 | $69,300 | I. $820 | 1.2 |
| Expenses | 51.462 | 44,400 | I. 7,062 | 15.9 |
| Net earnings | $18,658 | $24.900 | D. $6,242 | 25.1 |
| Per cent. of expenses | 73.5 | 64.1 | I. 9.4 | .... |

The increase in expenses was partly due to increased train service required by a larger winter traffic than usual, partly by severe weather, and partly by increased work on the road.

**Wind Gap & Delaware.**—The litigation over the extension of this road has been finally settled by a compromise. The Bangor & Portland Co. agrees to permit the crossing of its road by the new line without further opposition, while the Wind Gap & Delaware Co. on its part agrees not to extend its road beyond the old Bangor quarry for the next 5 years. This ends the dispute over the question.

**Union Pacific.**—This company, through its counsel has asked that the *quo warranto* proceedings begun on behalf of the state of Kansas to test the legality of the consolidation of the Union Pacific and the Kansas Pacific companies shall be discontinued. The company offers to pay all costs and other expenses incurred by the state, and expresses its willingness to comply with the requirements of the state, through its railroad commissioners, in its future policy, provided this petition is granted.